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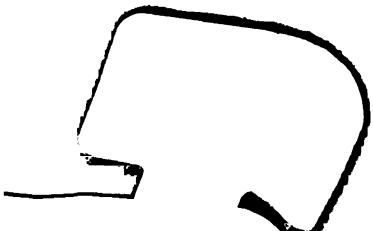

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THE CANADIAN

ENTOMOLOGIST.

VOLUME VI.

Edited by W. Saunders,
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ASSISTED BY

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., JANUARY, 1874. No. 1

EDITORIAL.

In accordance with a time honoured custom, we heartily tender to all our readers in this, the opening number of a new volume, the compliments of the season—a happy and a prosperous new year. It is meet at these annually recurring points in the history of our journal that we should briefly review the past, believing as we do that a recalling to mind the advances we have made and the encouraging success which has attended our efforts thus far will stimulate us to renewed exertion and make us hopeful and trustful for the future. Five years ago the CANADIAN ENTOMOLOGIST made its first appearance as a small eight paged magazine. Our members were scarcely sanguine enough to hope for a regular monthly issue even of this size, so in the opening number its appearance was promised occasionally, as material should accumulate; but our success has been beyond our expectations, the issue of our journal has been tolerably regular up to the present time; we have gradually increased its size from eight to twenty pages; have risen from common white paper to finely finished toned paper, have embellished our pages with many beautiful wood-cuts, and have presented to our readers from time to time Entomological matter in such variety as we trust will have met the views and wishes of all those who have favored us with their patronage. The work which our late esteemed Editor has so successfully carried on we shall, with his assistance and that of our other coadjutors, endeavour to continue.

To those who have aided us by their valuable contributions to our pages we are especially grateful, and we sincerely hope for a continuance of these esteemed favors. Pressed as we are with a burden of other work, we trust our friends will continue to forward their papers without waiting for personal solicitation. We propose to continue the monthly articles on our common insects, and also to furnish such gleanings in our

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summary as we think will interest the general reader, while at the same time we shall endeavour to maintain for our journal that scientific standing which gives it value in the eyes of so many of our co-laborers in the Entomological field.

We feel persuaded that our readers will not overlook the fact that this festive season is the time also for renewing their subscriptions; money is a motive power in our operations which we cannot overlook. This gentle hint will no doubt be heartily responded to, and we trust that while our members bear in mind their own liabilities in this matter, they will also try to induce as many of their friends as possible to join our ranks, so that the circulation of the ENTOMOLOGIST may be greatly increased.

ON SOME OF OUR COMMON INSECTS.

II. THE TIGER SWALLOW TAIL—Papilio turnus, Linn.

BY THE EDITOR.

All our readers must have seen the large tiger swallow tail butterfly floating about in the warm days of July and August, enjoying the

Fig. 1.

sunshine and sipping the honey from flowers. It is among our largest and handsomest butterflies. In figure 1 we have an excellent represen-

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tation of it. When its wings are expanded this insect will measure about four inches across. The ground color of its wings is a pale lemon yellow, which is banded and bordered with black; on the fore wings are four black bars, the inner one extending entirely across the wing, the outer ones shortening more and more as they approach the apex. The front margin is edged with black, and the outer margin has a wide border of the same in which is set a row of eight or nine pale yellow spots, the lower ones less distinct.

The hind wings are crossed by a streak of black which is almost a continuation of the inner band on the fore wings; there is a short black streak a little beyond at the end of the discal cell, and a wide black border widening as it approaches the inner angle of the wing. Enclosed within this border and towards its outer edge are six lunular spots, the upper and lower ones reddish, the others yellow; above and about these spots and especially towards the inner angle of the wing, the black bordering is thickly powdered with blue scales. The outer margin of the hind wings is scalloped and partly edged with yellow; the inner margin is bordered with dusky for about two-thirds of its length, followed by a small yellow patch, which in turn is succeeded by a larger black spot centered with a crescent of blue atoms and bounded below by an irregular reddish spot margined within with yellow. The hind wings terminate in two long black tails, edged on the inside with yellow. The body is black above, margined with pale yellowish; below yellowish streaked with black.

The under surface of the wings somewhat resembles the upper, but is paler.

This species passes the winter in the chrysalis state, and appears first on the wing from the middle to the latter end of May, but becomes much more plentiful during July. Whether these July insects are a second brood, or whether the bulk of the chrysalids which have wintered do not mature until about this time we are unable to determine; individuals which we have wintered over have escaped from chrysalis as late as the 3rd of June.

The eggs of *turnus* are deposited singly on the leaves of the different plants or trees on which the larva feeds. They are between one-twentieth and one-twenty-fifth of an inch in diameter, sub-globular, flattened at the place of attachment; colour dark green, surface smooth, without reticulations, but showing a few small irregularly distributed spots under

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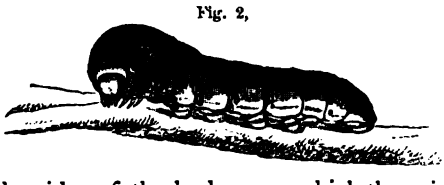
a magnifying power of forty-five diameters. In about ten or twelve days they begin to change colour, becoming darker, and very dark just before the young larvæ are hatched.

When fresh from the egg the larva is about one-tenth of an inch long, with a large black head and with a black body roughened with small brownish black tubercles. The second segment is elevated or thickened and of a dull glossy flesh colour, with a prominent fleshy tubercle on each side and a patch of white on the seventh and eighth segments, wide anteriorly, pointed behind; there is also a dull flesh coloured streak along the back on fourth and eleventh segments. The twelfth segment has a pair of fleshy tubercles rather prominent, but not so large as those on the second; both those on the second and twelfth have several short whitish hairs arising from them. The under surface is brownish black, with the feet and prolegs of the same colour.

The full grown larva, see figure 2, taken July 14th, measured one and a half inches in length. Its head is rather large and of a reddish brown colour, sprinkled with very short white hairs.

Fig. 2,



The body above, green, of a slightly darker shade on the anterior segments, paler on the sides of the body, over which there is a whitish bloom produced by a multitude of very minute white dots, with small short hairs of the same colour issuing from them; the anterior segments of the body are wrinkled. On the front edge of the second segment is a raised yellow fold slightly overhanging the head, and on each side of the fourth segment is an eye-like spot, nearly oval in shape, yellow, encircled with a ring of black, centered with a small elongated blue dot, which is also set in black and has above it on each side a black line nearly crossing the yellow spot. On the hinder portion of the fifth segment is a raised yellow fold, bordered behind with rich velvety black, the latter visible only when the larva is in motion; on the terminal segment is a similar fold flattened above, with a slight protuberance on each side. On the fifth segment, in front of the yellow fold, are two blue dots, one on each side of the dorsal line; there are also faint traces on the hinder segments of a continuation of these dots in longitudinal rows.

The under surface is of a paler green than the upper, with a whitish bloom; prolegs of the same colour, feet tipped with brown.

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As the larva approaches maturity and is about to change to a chrysalis, the colour of the body gradually grows darker until it becomes dark reddish brown, the sides nearly black. The minute whitish granulations and the blue dots become much more distinctly visible, giving the larva a very different appearance. It then selects some suitable spot in which to pass the chrysalis state, where it spins a web of silk in which its hind feet are entangled, and having prepared and stretched across a silken band to sustain its body in the middle, it casts its larva skin and remains a dull brownish chrysalis until the following spring.

This insect is widely distributed, being found throughout the greater portion of the United States and Canada. The larva feeds on a number of different trees, but chiefly affects with us the apple, cherry, thorn and basswood.

THE USE OF APHIS-EXCRETION AND BENEFIT DERIVED THEREFROM.

BY THOMAS G. GENTRY, GERMANTOWN, PA.

It is well known to the popular as well as scientific world that the *Aphides* secrete or rather excrete a peculiarly viscid and honey-like fluid which forms one of the chief delicacies of Ants. That it was originally designed to form an article of food for the latter is a supposition that cannot be entertained for a single moment; but that it is in some way connected with the preservation of the soft and tender beings by which it is manufactured, there can be no reasonable doubt. Various opinions have been hazarded, and not a few theories devised to account for its probable origin and use and the material benefit which it secures to the authors thereof, but these have been of such an unsatisfactory character as not to merit the approval of the learned.

While some writers have surmised its application to be connected in some way with the wants of the newly-born *Aphis*, still the lack of evidence confirmatory of any such surmise has caused it to fall into neglect and disuse.

That this fluid has both a primary and a secondary purpose to subserve in the economy of the plant louse is a fact the truth of which stands off as gross as black from white. Recently, while engaged in the study of the

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Aphis which particularly infests the blossoms of *Cucurbita ovifera*, I had the happy satisfaction of being a witness of a phenomenon which promised to solve the knotty problem. After a few moments of calm and deliberate reflection upon what I observed, the entire theory, the details of which I am about to delineate, became almost intuitively outlined upon my mind.

Feeding upon the flowers of this plant were hundreds of lice, the groupings of which not even a careless and hasty observer could fail to detect. There, like the patriarchal tribes we read about, were observable group after group, each composed of a head and a family of children of diverse ages and sizes. In the arrangement the young and newly-born, as if requiring the first care and earliest attention of the mother, were closely in her rear, the proximity to her presence in the case of the residue being apparently determined by their age.

While intently scrutinizing the actions of the various groups, one little fellow was observed to caress its parent by means of its antennæ, as if soliciting the bestowal of a favor. After the lapse of some few seconds the mother, acting in obedience to the child's wishes as thus expressed, slowly elevated the posterior part of her abdomen and ejected a honey drop upon the head of the latter, apparently to its infinite delight and satisfaction. It is my honest opinion, evidenced by repeated observations, that it is only during the first two days of the life of the offspring that this process of feeding is necessary, the digestive organs at this period being too feeble and delicate to partake of the strong juice of the flower without the entailment of injury. But after undergoing remarkable changes in the alimentary laboratory it becomes deprived of its injurious properties and rendered fit for the sustenance of life.

In conjunction with the previous discovery I remarked that the older and stronger seldom, if ever, deviated from the path over which their maternal head had passed, but seemed to find their chief good attained by following closely therein. It seems just to conclude that this would not be if they were amply qualified to look after their own temporal welfare ; but on the ground that parental provision and attention are still indispensable, the reason is obvious.

Plant lice being vigorous feeders, the manufacture and excretion of this fluid would necessarily be very great and profuse, and as nature does not work in vain, it might be argued that it is a sort of compensation which the insect lavishes upon the plant for the losses which it

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momentarily sustains. But to this opinion I cannot assent, as experience teaches me that the plant does not receive the least benefit therefrom. Even if it possessed any healing virtues, these could not manifest any marked effects, owing to the very rapid multiplication of the lice, which are constantly probing the wounds by means of their puctorial apparatus and thus serving to heighten instead of lightening the evil. Viewing the subject in this light, nature would seem to be defeating her own ends.

It is true that these highly mischievous creatures are slightly held in check by a few species of the Ichneumonidæ, Syrphidæ and Coccinellidæ, but their rate of increase is so enormously out of proportion to the number of their enemies that very little good results to plants.

From the preceding remarks it is evident to the mind of every candid reasoner that plants receive no material advantage from this excretion. It now remains to indicate its use. That it is of great service to the newly born *Aphis*, totally unfitted as it is both by nature and by structure to imbibe the strong, yet sometimes acrid and bitter fluids of plants, there can be no doubt. But as the supply is clearly above the requirements of such, why the excess? Most assuredly to serve as *pabulum* for their stronger companions. How? By uniting with the plant's forced excretion, thus diluting and rendering it a suitable material for imbibition and digestion. That its primary use is to serve as food for the lice during their early existence I think from the argument adduced must be obvious to all.

That a secondary purpose also is subserved thereby, to wit, the preservation of the species, there are just grounds for belief. It is well known to naturalists that ants do not merely possess a fondness for sugar, gums and saccharine solutions, but that they also manifest a decided penchant for the rich juices and tender tissues of animals; the liquids aud solids of humbler forms of insect life being sought after and devoured with avidity, save when the animals possess some peculiar properties that recommend them to the mercy of their enemies.

There is no doubt that the soft and juicy *Aphis*, which is esteemed such a rich morsel of food by the *Coccinella*, was primitively as delicious to the *Formica*, and that it shared equally with other feeble creatures of its class the murderous assaults of the latter. This condition of things doubtless continued for ages, until there appeared on the scene an ant possessed of more sagacity than any of its fellows.

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This ant having discovered the hidden virtues of the *Aphis* excretion there would dawn a new era in the history of the two species. The news of this discovery would doubtless become diffused not only through the colony of which this ant formed a part, but through the entire species and kindred species, for the *Formicidæ*, as is well known, exhibit in a remarkable manner the power of communicating their thoughts, wishes, &c., to each other.

As ants are endowed with a high degree of intelligence, considering the place which they occupy in the scale of created existence, they would not be slow to perceive that their chief good would be best attained by taking under protection the little creatures which are the authors of this luxury. From this time the ants would gradually abandon their sanguinary propensities, and little by little manifest their solicitude and regard for the latter by gentle strokes and caresses. The lice in turn perceiving the latter's disposition to friendliness, would cease by degrees to regard them as enemies, and would learn to cater to their physical wants. Thus would be developed these amicable relations which are known to exist between them, and which so admirably tend to their mutual good.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

Continued from Page 232, vol. v.

BUTALIS.

B. fuscicomella, Clem.

B. flavifrontella, Clem.

Both of these species occur abundantly in this locality; but the latter (my specimens can be nothing else) has the apical vein furcate before the apex, whilst Dr. Clemens says that it is simple. Mr. Stainton says it may be *B. basilaris*, Zeller.

B. matutella? Clem.

I am not altogether certain that my specimens belong to this species which I know only by Dr. Clemen's description. The neuration of the wings in my specimens is the same with that of Dr. Clemen's species as

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given by him; but there are some structural points in which it differs from *Butalis*, and Dr. Clemens' specific description is applicable to only a small proportion of individuals out of the many that I have examined. My specimens have been bred from larvae found mining the leaves of the great hog weed *(Ambrosia trifida)* and various species of Aster *(A. ericoides* and *A. sagittifolius)*. It spins a small web on the under side of the leaf from which it passes into the leaf, eating out the parenchyma in small patches. It makes several mines before passing into the pupa state. The mine is at first convoluted, narrow and filled with frass, but soon becomes a clear transparent blotch somewhat like the mine of *Bedellia somnulentella* in leaves of the morning glory *(Ipomea)*. It pupates in a dense web which it spins around itself, and which is but slightly attached to the surface of the leaf.

In the imago state the tongue is scaled at the base only, the wings are carried slightly deflexed in repose instead of being folded around the body as in the true species of *Butalis*. The primaries have only three instead of four veins beneath the apical one, and the head is rather less obtuse and is scarcely at all retracted. I had at first inclined to erect for it a new genus, and specimens in my cabinet were labelled *Sinoe ambrosiaeella*, and have been distributed to some correspondents under that name. The neuration of the wings is very similar to that of the genus *Aybia*, but the palpi are very different.

The imago is shining bronzy dark brown, with a purplish tinge. Usually there is a whitish yellow spot on the fold of variable size, sometimes spreading to the dorsal margin, sometimes scarcely discernible, and sometimes absent: there is always a distinct streak of the same hue at the beginning of the dorsal cilia, and a white patch on the abdomen beneath near the apex. *Al. ex.* ½ inch.

The larva is at first white with green contents; then a small black spot appears on each side of the first segment, and afterwards a series or line of similar spots extends along the entire length of the larva and ultimately they become purple. In the later larval stages a purple line appears on each side of the median one. There is a small blackish spot behind each eye. In the adult larva the 9th and 10th segments become purple on top and the purplish longitudinal lines above mentioned are connected on the posterior margin of each segment by a transverse band of the same hue. It has sixteen feet, the thoracic ones being piceous. It may be found in all of its stages from June until the fall of the leaves.

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ARGYRESTHIA.

A. oreasella. Clem.

Mr. Stainton states in his edition of the Clemens papers that this is the European *A. andereggiella.* It is the only species of the genus heretofore described from this country. I have never met with it in this locality but have received from Mr. Wm. Saunders several specimens with the information that they were all taken whilst resting on the leaves of a thorn bush *(Crataegus ——— ?).* In my specimens there is nothing that can be called an 'eye cap' only a few long scales pendant over the eyes from the elongate basal point of the antennæ, and the body, wings and antennæ more slender than in the species described below as *A. undulatella.* The neuration of the wings in *oreasella* is exactly that given by Mr. Stainton *(Ins. Brit. Lep. Tin., v. 3)* for *A. nitidella.*

A. undulatella. N. sp.

Not having recognized this as a true *Argyresthia* formerly, it was labelled in my cabinet *Chalciope undulatella,* and has been distributed to some correspondents under that name, and also under the names *Polyxo undulatella* and *Albunea undulatella.*

It is more robust than *oreasella,* the primaries are wider, the tuft on the vertex is larger, the basal joint of the antennæ is enlarged and has a distinct eye cap; the antennæ are much more robust and each joint is clothed with rather spreading scales so that it is enlarged towards its apex, the succeeding joint being inserted in the centre of its apex.

The neuration of the primaries is like that of *oreasella,* but in the secondaries the discal vein is absent from the subcostal to the first branch of the discal, so that the cell is partly unclosed.

I have named the species *undulatella* from its habit of 'see-sawing' on its middle legs before it comes to rest in the attitude of the other species of the genus, resting on its head with the apex of the body and wings projecting at an obtuse angle to the object on which it rests. It is very sluggish and not easily disturbed. It is found in considerable numbers in May resting on the trunks of Elm trees. The larva is unknown.

A. undulatella. N. sp.

Palpi brownish, at base white; face white around the mouth, brownish above. Tuft and eye caps snowy white. Antennae checkered with alternate black and white spots. Thorax and dorsal half of the primaries

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snowy white; costal and apical portions brownish or dark brown, sometimes dusted with white and sometimes (usually) with streaks of the white extending into the brown portions, sometimes so as to divide it into two or three brownish costal streaks. There is great variety in the shade and proportions of the whitish and brownish portions of the wing, but snow white is the characteristic color of the basal and dorsal parts and brownish of the costal and apical parts, with the line between them more or less emarginate. *Al. ex.* ⅓ inch. Kentucky.

A. apici-maculella. N. sp.

In this species the eye cap is as distinct as in *undulatella*, but the stalk is simple and slender as in *oreasella*. The neuration of the primaries is that given by Mr. Stainton for *A. arceuthina (loc. cit.)* In the secondaries it is the inferior portion of the discal vein that is absent instead of the superior, as in *undulatella;* that is the portion next to the median vein.

Shining silvery white, each joint of the antennae (except the basal one) is dotted above with dark brown. Primaries with a blackish or dark brown shining almost triangular spot at the apex, with three pale and indistinct brownish costal streaks before it; the first of these streaks is the shortest and most indistinct, and is placed at the beginning of the ciliae. The second is a little more distinct and sometimes extends entirely across the wing, and the third one always does so after dividing into two branches just before the apical spot. These streaks are usually more or less interrupted and sometimes spread over the apex so that it might perhaps be more correctly described as dusted than streaked. There is a bright though pale golden basal streak just within the costal margin. *Al. ex.* ⅜ inch. Kentucky, in oak woods, in June and July.

THE FAMILIES OF DIPTERA.

BY FRANCIS WALKER, LONDON, ENGLAND.

The two-winged flies are more important in nature than any other order of insects because of their number and diffusion, and the families may be briefly traced in succession previous to a more extended notice of each of them, in case the subject should become more interesting.

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Family 1, PULICIDÆ.
" 2, MYCETOPHILIDÆ.

In the following arrangement the first manifestation of Dipterous existence is associated with the inmost recesses of man's habitation, and a few beasts and birds also partake of its presence in their dwellings. In this form it has some perfections in which it exceeds all the rest of the race, being unequalled in strength and in activity and in endurance of pressure. The dismissal of this wingless fly will be readily accepted, and there is a wide gap between it and the next form of Dipterous life wherein it is transferred to the fungoid-race, and here its work is to appropriate and elaborate the substance of the fungus and to raise it to its own level, and this will be said to be just contrary to the first scene in which it reduces the circulation of the vertebrata to its own purposes. In the second scene the fly has in some cases much resemblance in the body and in the legs to the first family, but the strength and the activity are comparatively passed away, and the structure of the mouth is much changed and much less effective; however, it has a compensation in the possession of wings. Even in the small extent of England there is yet much to learn about the fungus-flies, but there is a much wider field for observation in Canada and in the more northern regions of America where the gradual diminution and cessation of the race may be traced. Winnerty has contributed much more than any one else to the history of this family, and his synopsis of the sub-families is here translated:

A—Middle transverse vein elongated.
a—Brachial vein wanting.....1 Diadocidinæ
b—Brachial vein present.
*—Antennæ not very long.
†—Brachial vein long.....2 Mycetobinæ
† †—Brachial vein short.....3 Ceroplatinæ
* *—Antennæ very long.
†—Antennæ setiform.....4 Bolitophilinæ
† †—Antennæ filiform.....5 Macrocerinæ
B—Middle transverse vein not elongated.
a—Brachial vein present.....6 Sciophilinæ
b—Brachial vein wanting.....7 Mycetophilinæ

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NOTES ON NOCTUIDÆ.

BY AUG. R. GROTE,

Curator of Articulata, Buffalo Soc. of Natural Sciences.

Agrotis badinodis, Grote.

♂. Antennæ pectinate. All the tibiæ armed or spinose. Abdomen a little flattened. Body slender; wings ample and wide. Nearest to *Agrotis collaris*, but with wider wings, and larger and differently colored. Smooth, pale brown. Transverse lines even, with coincident pale shades. Basal half-line evident; on the sub-basal space a pale dot followed by darker scales situate on median nervure. Transverse anterior line straight, touching the broader superior portion of the large orbicular on subcostal nervure, and leaving on the disc an intensely blackish brown space to obtain between the narrower lower portion of the orbicular and the line. Reniform, like the orbicular, concolorous, with narrow pale edging, hardly as large as the orbicular and broader below than above. Space between the spots deep, faintly reddish brown, deepening to median nervure. The diffuse median shade apparent below median nervure. Claviform large, concolorous, indistinctly limited. Transverse posterior line even, regularly arcuate, much as in *collaris*. Subterminal space dark reddish brown; subterminal line faint, narrow, irregular, pale; terminal space paler, less reddish brown than the subterminal. Terminal line broken into minnte dots; fringes dark.

Hind wings concolorous, dark silky fuscous, with pale fringes. Beneath with a reddish brown tinge; a common diffuse fuscous line, and a dark discal spot on the hind wings which are palest and notably irrorate. Collar dark, thorax pale brown; abdomen like hind wings. *Expanse*, 35 m. m. *Habitat*, Maryland (coll. Lintner, No. 2506.)

The antennal pectinations are longer than in *triangulum*, the color different, the orbicular differently shaped.

Eurois occulta.

I have determined this species in the collection of Mr. Lintner, from New York, and in that of the Laval University, Quebec. It is a robust form, resembling *Mamestra nimbosa* in appearance, but structurally distinguished by the naked eyes, spinose fore tibiæ and excavated genital

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pieces. It should be considered as the type of Hubner's genus *Eurois*, a name which has priority over *Aplecta*, and is cast for the same species, most of which, as Lederer has shown, are not properly separable from *Mamestra*. *Polyphaenis* seems to me equally valid with *Eurois;* I am not therefore agreed with v. Heineman's fusion of the species of the two genera under the name of *Aplecta*. The late Mr. Walsh has already referred to this species as found in this country. The list of species common to both continents, given in the Proc. Ent. Soc. Phil., vol. 3, p. 214, contains, however, several errors of different kinds, and is therefore unreliable.

Luperina reniformis, Grote.

♂ ♀. Eyes naked, without lashes. Tibiæ all unarmed. Maxillae weaker than in *Hadena*. Abdomen conical, apparently without tufts in the ♀, with longer dorsal depressed scales in the ♂, in either sex not with the thick squamation of *Hadena*. A little larger than *Hydr. sera*, which it resembles, but is more blackish, and the reniform is contrastedly annulate with white scales which usually extend along veins 3 and 4 at base, as in *Haworthi*. Beneath the thoracic squamation is somewhat woolly. Blackish brown; suhterminal space usually contrasting by its pale ochreous color. Median space wide. Orbicular an oblique finely and faintly pale ringed annulet, concolorous with the wing. Claviform indistinct, black. Reniform very narrow, its base visible between veins 3 and 4, neatly ringed with pure white, preceded by a pale vertical streak which appears to cover the closure of the cell, but which is probably part of the true outer annulus of the spot. Median shade black, irregular, faint. T. p. line accentuated on the nervules, even, pale between double lines, not retreated on cell 2, followed by black nervular dots on the subterminal space. Subterminal line preceded by a dark brown shade which shows some more determinate shade marks, produced opposite the median nervure. Terminal space black, narrow. Interspaceal terminal black dots. The narrow brown fringes cut with pale at extremity of the veins. Hind wings pale fuscous with soiled veins, beneath with distinct dot and faint transverse line. Varies by the darkening of the subterminal space, and obsolescence of the pale scales on the median nervules. Antennnæ simple in both sexes. *Expanse* 36 m. m. *Habitat* Canada; New York (Mead, No. 120; Lintner, No. 3588 and No. 3741 var.) Collection of Buffalo Society N. Sciences.

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Hadena fractilinea, Grote.

♀. Eyes naked, with lashes. Thorax with anterior and posterior crests; the dorsal abdominal tufts are minute. Legs unarmed. Size moderate; squamation smooth. Dull blackish and very pale dull carneous brown. The pale color obtains along the internal margin of the fore wings and largely subterminally, extending to the apices without the undulate ferruginous subterminal line. The blackish color obtains at base and superiorly along costal region, and surmounting the pale subterminal space and over the constricted terminal space. The contrast between the two tints is variably strong, the blackish color becomes in some specimens dull brownish and the pale tint obscure and dusky. The median space is blackish above submedian fold, narrowed inferiorly; the ordinary spots small, orbicular concolorous with a fine pale annulation, reniform with the centre of the paler shade of the wing, with a dark internal streak. Transverse posterior line incompletely geminate, followed by a series of minute black and pale nervular dots. The twice prominently undulated subterminal is preceded by a more or less obvious ferruginous shade. Fringes black, narrowly cut with pale at the extremity of the veins. Hind wings concolorous brownish grey, rather dark, without lines; fringes pale with a narrow dark internal line. Beneath paler, dusted with dark scales, with a purplish or carneous tinge and a tolerably distinct exterior common line, more denticulately waved on secondaries. Patagia mixed with blackish scales; disc and tufts paler, touched with ferruginous; abdomen like hind wings. *Expanse*, 28 to 30 m. m. *Habitat*, Canada (Pettit, No. 1594); Albany (Lintner, Nos. 3568 and 1998). Much smaller and distantly recalling *rurea* in the disposition of the colors. It has apparently also a resemblance to the European *Agrotis putris*, but is generically distinct, and differs by the dark opaque secondaries.

Hadena cariosa.

Xylophasia cariosa, Guenee, p. 144.

The median lines are more distinct than in its immediate allies. The median space is narrowed inferiorly, the large claviform extends to the transverse posterior line.

Cerastis alternata.

Noctua alternata, Grote, Proc. Ent. Soc. Phil., Vol. III.

Eastern States; New York; Pennsylvania.

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Cerastis cupida.

Noctua cupida, Grote, Proc. Ent. Soc. Phil., Vol. III.

Eastern States; New York; Pennsylvania.

Telesilla cinereola.

This species is the *Placodes cinereola* of Guenee, but the generic name had been previously used, and Herrich-Schaffer in consequence proposed the present designation for the European *amethystina*, and which should be retained for our species. Lederer's term *Eucarta* is later and has been withdrawn, in favor of *Telesilla*, by its author. Hubner enumerates the European species under Trigonophora, the type of which is quite distinct structurally from *Telesilla amethystina.*

Plusia gamma, (Linn).

Habitat, California (Hy. Edwards, No. 147).

I cannot distinguish the American specimens specifically. This species has been credited to Canada by Kirby (p. 307), and also to Hudson's Bay by Mr. Walker, in the British Museum Lists.

Adipsophanes miscellus, Grote.

Habitat, California (Hy. Edwards, No. 187).

ENTOMOLOGICAL READINGS,

Suggestive and Reflective.

BY W. V. ANDREWS, NEW YORK.

"There are no satisfactory distinctions between some of the moths which enable any one to say that they are of such and such species, and very frequently they are separated into different kinds because they happen to feed on various plants, and because the moths are not all colored in the same manner. Of course the Entomologists that believe in the real nature of species have taken a vast deal of trouble with the Noctuina, but those who do not think a species to be anything more than an abstract idea, and that it really consists of the sum of the variations of a closely allied series of forms, do not see the use of this Natural History hair splitting."—*Duncan's Transf. of Insects, p. 125.*

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" Many naturalists have observed that the species of *Solenobia*, one of the Tineidæ, have a most exceptional power of reproduction. The maiden females of the genus lay eggs which can be hatched so as to produce larvæ, and a naturalist may breed a species for years without seeing a male *Solenobia*. This extraordinary fact is not without parallel amongst the Lepidoptera * * * and it is common among the bees and the aphides."—*Duncan's Transf. of Insects, p. 146.*

NOTE.—To many persons there will be, I hope, nothing new in the above statement, but there are more to whom it will not only be new but also incredible. In this connection I wish to state an occurrence, which, although not quite conclusive in its character, may, if known, recall to others similar occurrences with the same species, and they may have met with more definite results.

Two years ago, wishing to rear several broods of *Eacles imperialis*, I placed a female of that species in a favorable situation for attracting the male. I had forgotten whether the male usually remained in the company of the female for a long or a short time, and watched pretty closely till 1 o'clock a. m., for the purpose of ascertaining that fact.

I was much chagrined to find that at none of my visits was there any male visible. I was up betwixt 3 and 4 o'clock, a. m., still no male; and at broad daylight the result was the same. The female had, however, laid on the branches of the tree on which she was confined about thirty eggs, and although I considered them worthless, I put them into a small box without quite knowing why. I removed the female the next night to a still more promising spot, hoping that the eggs remaining in her might still be impregnated. No trace however of a male was visible, but, by the next morning, she had laid a quantity of eggs which I secured as before.

Every one of these eggs were fertile; but now comes the curious part of the matter. Every one of the larvae were of the dark brown variety, not a green one amongst them.

Now what I would like to learn is this: Does any one know of any case in which *imperialis* has produced fertile eggs without male assistance and, if so, what color were the larvae?

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CORRESPONDENCE.

SAN FRANCISCO, CAL., NOV., 1873.

DEAR SIR,—

Many printed pages you devote to the question of nomenclature and rights of priority of generic and specific names. Allow me a small space in your columns to say a word in no way personal, still from a different point of view, yet with deference to the contending opinions.

In the first place I would claim a general acknowledgement for such compilers of entomological material as have in an exhaustive way at their time—so far as exhaustion is possible—published the results of their researches, and which compilations form entireties of certain large groups of insects. I will refer to only a few, among them Burmeister, for his Rhynchosa and Gymnognatha; Gyllenhall, for his North European Coleoptera; Harold and Gemminger's Munich Catalogue of the World's Coleoptera; also, Ochsenheimer and Freitschke's work on Lepidoptera of Europe, this latter one *so* complete with Geometridæ and Micros.

All these compilers have worked with the full understanding of the value of generic names come down to them from earlier authorities, have been guided by the wish of letting Linne's and other great author's earliest names stand for the typical genus, giving room at the same time where, by newer discoveries, new genera had necessarily been created, for their interpolation. The great completeness of these published compilations, based upon conscientious researches, is what has created, if not all over the world, at least in Europe, the use and endearment of certain generic names that in my opinion might be everywhere respected, and will, I hope, everywhere and for ever be adopted. I see no necessity of going further back than the authority of such great compilers, even if a few errors of judgment, as likely, have occurred.

To restrict my observations to Lepidoptera only, I will here especially refer to Ochsenheimer and Freitschke's work of wonderful completeness; it treats of European Lepidoptera only. The European Fauna has its representatives all the world over, and it is around and between European genera that the world's new species have to be ranged, whether or not the formation of new genera becomes necessasy. Such ground work or basis for a complete series of classes and genera as O. & F. have compiled might, in my opinion, be followed up and their generic names without omission be adhered to. Addressing American Entomologists, I would

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allow myself the question: Might not all controversy about generic names, whether from earlier or later editions of Linne's or from other early authorities, be dropped, and all punctilious adhesion to priority be dismissed; might not the long-familiar names on the strength of above named second-hand authorities be with safety fixed upon as final and generally acknowledged?

Yours respectfully,

JAMES BEHRENS.

P. S.—It would be well if the authors of new created generic names would give their Greek or Latin derivations.

HABITAT, ECONOMY, ETC., OF AGROTIS FENNICA, EVERSMAN.

SPRING BANK, ST. CATHARINES, ONT., DEC. 22, 1873.

DEAR SIR,—

I am very anxious to obtain information respecting *Agrotis fennica*, Eversman, whether it is an abundant species in any part of Canada or the United States, and, being a stranger in this country, would be very thankful would any gentleman conversant with the insect, kindly aid me in the pages of the CAN. ENT., by any information he may posess touching its economy in the larval state, food plant, time of year when the imago is found, or any other necessary details.

Finally, should any Entomologist have duplicate specimens to spare, I need scarcely say they will be very acceptable, and later on in the season I will do my best in return to repay the obligation, and send an equivalent in any desirable species from this neighborhood.

I have read with much interest the articles on collecting in late numbers of the CAN. ENT., especially as my experience with cyanide of potassium as a killing material induced me years ago to abandon that method. I had the material both in tight-fitting boxes and glass-stoppered bottles, in all cases the cyanide being covered with a stratum of plaster of Paris. As a killer it does admirably, but, according to my experience, it renders the moths so rigid that in setting the wings are very liable to be torn in lifting them into position. This method of killing with cyanide was, indeed, condemned years ago in England owing to this very cause.

GEO. NORMAN.

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ZOOLOGICAL MUSEUM, CAMBRIDGE, U. S., DEC. 20.

DEAR SIR,—

I have commenced to study and arrange the Coleoptera in the Museum, and hope to get help on all sides, and shall be particularly glad to see specimens in the less studied groups. At present I have finished the N. American Phytophaga, and hope to work at the Staphylinidæ ere long. I also want to see all the Dytiscidae that I can, as it is only by a long series that much can be done. I shall be glad to hear from any one interested in exotic insects, also. Yours truly,

G. R. CROTCH.

LARVA OF P. BREVICAUDA.

We extract the following from a letter recently received from Mr. Edwards :—Miss Peart has drawn the larva of *brevicauda*. It differs from *asterias* larva in that the black transverse bands are broken, and no yellow spots are between them; the lowest black spot is triangular, and so to each band. It is more like *zolicaon*, although that has yellow spots. The point is that it is not *asterias*.

W. H. EDWARDS, Coalburgh, W. Va., 18th Nov., 1873.

Not published until Jan 1874
Distributed Feb. 10. 1874

BOOK NOTICES.

Hackberry Butterflies. Descriptions of the early stages of Apatura Lycaon, *Fabr.* and Apatura Herse, *Fabr.*, with remarks on their synonymy, from the Trans. St. Louis Acad. Science. 8 vo., pp. 14, with four illustrations by Chas. V. Riley, M. A., Ph. D., St. Louis.

On Platypsyllidæ, a new family of Coleoptera, from the Proceedings of the Zoological Society of London, 8 vo., pp. 6, with one plate, by J. L. Le Conte, M. D.

Seltsame Geschicte eines Tagfalters, von Samuel H. Scudder.

Proceedings of the Boston Society of Natural History, vol. xv, parts 3 and 4, Dec., '72 to April, '73.

Nature, to December 11th.

Science Gossip, December.

American Naturalist, December, 1873, January, 1874.

Canada Farmer, December 15 and 30.

Prairie Farmer to Dec. 27.

The Horticulturist, Nov. and Dec..

Rural New Yorker to Jan., '73.

American Agriculturist, Jan.

Maine Farmer to Dec. 27.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., FEBRUARY, 1874. No. 2

THE FOOD-PLANTS OF EUROPEAN BUTTERFLIES.

BY S. H. SCUDDER, CAMBRIDGE, MASS.

Kaltenbach is publishing a work entitled *Die Pflanzen-Feinde aus der Classe der Insecten*, two parts of which have appeared and carry the investigation through the willows. He enumerates all the German insects known to feed upon particular plants; annotated lists of more than three hundred species of insects are sometimes ascribed to a single tree. Among these are many butterflies, and by collating them I have prepared the following list, believing that, as it is fuller than any yet published, it will be of great service to those who are endeavoring to discover or extend the histories of our own butterflies. As soon as the work of Kaltenbach is completed, a supplement will be prepared to this list. The nomenclature of the butterflies is altered to make it accord with Staudinger's last catalogue.

1. *Apatura iris*—Salix caprea, S. aurita.
2. " *ilia*—Salix, Populus tremula, P. dilatata.
3. " " var. *clytie*—Populus tremula, P. canescens.
4. *Limenitis populi*—Populus tremula.
5. " *camilla*—Lonicera cœrulea, L. xylosteum, L. caprifolium, L. periclymenum.
6. " *sibilla*—Same plants as the preceding.
7. *Vanessa levana*—Urtica dioica.
8. " *egea*—Salix, Parietaria officinalis.
9. " *C. album*—Ulmus campestris, Humulus lupulus, Urtica urens, Ribes rubrum, R. grossularia, Corylus avellana, Lonicera xylosteum.
10. " *polychloros*—Pyrus communis (pear), P. malus (apple), P. cydonia (quince), P. cerasus (cherry), Ulmus, Salix, Populus, Cornus.

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11. *Vanessa xanthomelas*—Populus, Ulmus, Salix caprea, S. acuminata, S. glauca, S. vitellina.
12. " *L. album*—Ulmus, Salix.
13. " *urticæ*—Urtica hispida, etc.
14. " *io*—Urtica, Humulus.
15. " *antiopa*—Salix, Betula, Populus, Tilia (Ulmus is not given.)
16. " *atalanta*—Urtica dioica, U. urens.
17. " *cardui*—Cirsium oleraceum, C. arvense, C. palustre, C. lanceolatum, Carduus natans, Malva rotundifolia, Gnaphalium arenarium, G. luteoalbum, Achillea millefolium, Artemisia vulgaris, Filago arvensis, Onopordum acanthium, Cynara scolymus, Centaurea benedicta, Urtica dioica, Carlina.
18. *Argynnis aphirape*—Polygonum distorta, Viola palustris.
19. " *selene*—Viola canina, V. tricolor.
20. " *euphrosyne*—Viola canina.
21. " *pales*—Viola montana.
22. " *dia*—Viola odorata.
23. " *daphne*—Viola, Rubus idæus, R. fruticosus.
24. " *ino*—Urtica.
25. " *lathonia*—Viola arvensis, V. tricolor, Hedysarum onobrychis, Anchusa officinalis.
26. " *aglaja*—Viola canina.
27. " *niobe*—Viola odorata, V. tricolor.
28. " *adippe*—Viola odorata, V. tricolor.
29. " *paphia*—Hesperis tristis, Viola canina, Rubus idæus, Urtica.
30. " *pandora*—Viola.
31. *Melitæa cynthia*—Plantago lanceolata, Pedicularis rostrata.
32. " *maturna*—Melampyrum nemorosum, Populus tremula, Salix capræa, Fraxinus excelsior, Veronica, Plantago.
33. " *aurinia*—Geranium sanguineum, Scabiosa, Veronica, Plantago.
34. " *cinxia*—Plantago lanceolata, Veronica, Hieracium pilosella, H. canescens.
35. " *phœbe*—Centaurea scabiosa, C. jacea.
36. " *trivia*—Verbascum thapsus, V. nigrum.
37. " *didyma* — Artemesia abrotanum, Plantago, Centaurea, Stachys, Linaria vulgaris, Veronica, Teucrium chamædrys.

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38. *Melitæa dictynna*—Melampyrum nemorosum, Spiræa aruncus, S. ulmaria, Veronica.
39. " *athalia*—Melampyrum sylvaticum, M. pratense, M. nemorosum, Plantago, Veronica chamaedrys, Chrysanthemum corymbosum, Digitalis ochroleuca.
40. " *aurelia*—Plantago.
41. " " var. *britomartis*—Veronica chamaedrys, Melampyrum pratense.
42. " *parthenie*—Plantago lanceolata, Centaurea jacea, Melampyrum pratense.
43. *Nemeobius lucina*—Rumex, Primula.
44. *Thecla betulæ*—Prunus spinosa, P. armeniaca.
45. " *spini*—Rhamnus saxatilis, R. cathartica, R. frangula, Prunus spinosa, P. domestica.
46. " *W. album*—Ulmus campestris.
47. " *ilicis*—Ulmus.
48. " *acaciæ*—Prunus spinosa.
49. " *pruni*—Prunus spinosa, Amygdalus communis, Rhamnus cathartica.
50. " *rubi*—Prunus spinosa, Rhamnus, Cytisus, Hedysarum onobrychis, Amygdalus persica, Rubus, Genista, Ledum palustre.
51. *Lycæna bœtica*—Spartium, Colutea, Phaca bœtica.
52. " *telicanus*—Lythrum salicaria.
53. " *argiades*—Lotus corniculatus, Anthyllis vulneraria, Medicago falcata, M. lupulina, Trifolium arvense, T. pratense, Pisum sativum.
54. " *argyrotoxus*—Genista, Colutea arborescens, Trifolium.
55. " *argus*—Rhamnus, Trifolium montanum, Mellilotus officinalis, Genista germanica, Spartium scoparium, Hedysarum onobrychis, Lotus corniculatus, Erica vulgaris.
56. " *optilete*—Vaccinium oxycoccos.
57. " *orion*—Sedum telephium.
58. " *astrarche*—Erodium cicutarium, Geranium dissectum, G. pusillum.
59. " *icarus*—Trifolium, Mellilotus, Genista, Ononis spinosa, Astragalus glyciphyllos, Fragaria vesca, Medicago.

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60. *Lycæna bellargus*—Trifolium, Coronilla varia, C. montana, Hippocrepis comosa, Genista sagittalis, Stachys.
61. " *coridon*—Vicia, Astragalus, Coronilla varia.
62. " *hylas*—Trifolium, Mellilotus officinalis.
63. " *dolus*—Trifolium.
64. " *damon*—Hedysarum onobrychis.
65. " *argiolus*—Rhamnus frangula, Mespilus, Pyrus malus.
66. " *minima*—Anthyllis vulneraria.
67. " *semiargus*—Mellilotus.
68. " *cyllarus*—Astragalus glyciphyllos, Trifolium, Mellilotus, Genista sagittalis, G. germanica, Hedysarum onobrychis.
69. " *jolas*—Colutea arborescens.
70. *Polyommatus virgaureæ*—Solidago virgaureæ, Rumex acutus, R. acetosa.
71. " *dispar*—Rumex, Polygonum.
72. " *hippothoe*—Rumex acetosa.
73. " *alciphron*—Rumex acetosa.
74. " *dorilis*—Rumex acetosa, R. acetosella.
75. " *phlæas*—Rumex acetosa.
76. " *amphidamas*—Rumex acetosa, Polygonum bistorta, Viola canina.
77. *Rhodocera rhamni*—Rhamnus cathartica, Frangula, Mespilus germanica, Pyrus.
78. " *cleopatra*—Rhamnus alpinus.
79. *Colias palæno*—Hydrocotyle vulgaris, Vaccinum uliginosum.
80. " *hyale*—Coronilla varia, Trifolium, Vicia.
81. " *myrmidone*—Cytisus biflorus, C. nigricans.
82. " *edusa*—Onobrychis, Cytisus.
83. *Pieris brassicæ*—Brassica, Rhaphanus sativus, Cochlearia armoracia, Sinapis, Lepidium sativum, Tropæolum, Cheiranthus annuus.
84. " *rapæ*—the same plants as the preceding, and also Reseda.
85. " *napi*—Brassica oleracea, B. napus, Reseda lutea, R. luteola, R. odorata, Turritis glabra, Alliaria officinalis, Sinapis.
86. " *daplidice*—Reseda lutea, Turritis glabra, Erucastrum, Rhaphanus rhaphanistrum, Sisymbrium sophia, Capsella bursa-pastoris, Alyssum incanum, Sinapis, Thlaspi.

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87. *Aporia cratægi*—Cratægus oxyacantha, Prunus spinosa, P. domestica, P. padus, Pyrus malus, P. communis, Mespilus, Sorbus.
88. *Anthocaris cardamines*—Alliaria officinalis, Cardamine impatiens, Turritis glabra, Brassica campestris, Hesperis, Sinapis, Thlaspi.
89. *Leucophasia sinapis*—Lotus corniculatus, Lathyrus pratensis, Trifolium pratense (Sinapis is not given).
90. *Parnassius apollo*—Sedum album, Telephium, Sempervivum tectorum.
91. " *mnemosyne*—Corydalis bulbosa, C. solida.
92. *Papilio sinon*—Prunus spinosa, P. domestica, Pyrus malus, P. communis, Amygdalus persica, A. communis, Quercus.
93. " *machaon*—Carum carui, Anethum foeniculum, Apium graveolens, Daucus carota, Pimpinella saxifraga, Angelica sylvestris, Peucedanum chabrei, Heracleum, Oreosilinum.
94. *Nisoniades tages*—Iberis pinnati, Eryngium campestre, Lotus corniculatus, Coronilla varia.
95. *Spilothyrus alceæ*—Malva.
96. *Syrichtus alveus*—Polygala chamæbuxus.
97. " *malvæ*—Malva moschata, Plantago lanceolata, Fragaria, Comarum, Rubus.
98. " *sao*—Rubus idæus.
99. *Carterocephalus palæmon*—Plantago.
100. *Hesperia sylvanus*—Plantago major, Althea rosea, Malva moschata, Lavatera communis.
101. " *comma*—Coronilla varia.

NOTES ON COLLECTING CATOCALAS.

BY ROBERT BUNKER, ROCHESTER, N. Y.

In many respects the Catocalas are among the most interesting of the moths. The contrast of color between their fore and hind wings renders them objects of great beauty, and hence these fair forms of the woods

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are eagerly sought after by collectors. My spare time this season was spent in collecting Catocalas. In this part of the country they may be found from the first of June till the first of November. *Amasia* and *ultronia* are seen first; I took a fine *amasia* on the 29th of May, and an *ultronia* on the 10th of June. *Cara* and several other species may be found as late as the first of November.

Oak woods, where the trees are young and sufficiently scattered to admit the sunlight, are the most favorable places for collecting. In a small piece of woods of not more than four acres, I captured thirty-two specimens, among which were thirteen different species. I was unable to visit the place more than eight times; probably many more could have been taken had my visits been more frequent. My collecting was done in this manner: On approaching a tree I examined the trunk carefully up as high as the first limbs; if a Catocala was seen, and low enough down to reach, I used a paper box (collar box) to secure the prize, but if high up the net was brought into requisition. If I failed to find one, I gave the tree a vigorous shake, and if one was lurking anywhere about the trunk it was sure to start up and fly, generally but a short distance, when it would settle, and by cautiously approaching the tree I found no difficulty in securing it. Sometimes two would start up from one tree, generally male and female, and in such a case it was no easy matter to follow both of them; still I generally managed to secure them. As I examined trees I marked them with chalk to save the trouble of working the ground twice over.

Catocalas, like the lappet moths, usually alight on objects that harmonize with their own colors. Those with light grey fore wings were found on white oak *(Quercus alba)*, and those with dark wings, like *epione* and *cara*, on black oak *(Quercus nigra)*.

In a late number of the ENTOMOLOGIST, Mr. Grote gave us a list of the Catocalas, fifty-nine in number; he now adds four new ones to the list. My impression is that additional species will be found in the northern and middle States.

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ON SOME OF OUR COMMON INSECTS.

12. *THE AMERICAN COPPER UNDERWING—*

Amphipyra pyramidoides; Guen.

BY THE EDITOR.

This insect is a troublesome one in many parts of our province, and is yearly increasing. It first attracted attention by its depredations on the foliage of the vine, but now, with us, while it is still a plague in the vinery, it is more abundant on plum and apple trees, and is also common on the thorn. It has been known in popular language as "the pyramidal grape vine worm" on account of the larva having a pyramidal hump near the end of its body; also as "the green grape vine worm," in consequence of the larva being of a green colour, but since it is not by any means restricted to the grape, we prefer the common name placed at the head of this article—"the American copper underwing"—given to it because the hind wings of the moth are of a lustrous copper colour. A very similar moth, *Amphipyra pyramidea*, Linn., is common in Europe, the larva of which feeds on the oak, elm, poplar and other trees, and since this insect is known in England as "the copper underwing," we think the common name we have referred to, which was first suggested by Mr. Riley, is a very appropriate one for our species.

Fig. 3,

The larva, of which a very good representation is given in figure 3, first attracts notice early in June, when it may be found about half grown and feeding vigorously; by the middle of the month it has usually attained its full size, when it measures from one and a quarter to one and a half inches in length. The head is rather small, flattened in front, and of a whitish green color, with the mandibles tipped with black. The body is of a delicate whitish green, a little darker on the sides, with a white stripe down the back, a little broken between the segments and somewhat widened behind. On each side, close to the under surface, there is a

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bright yellow stripe which is most distinct on the hinder segments, and a second one of the same color, but fainter, half way between this and the dorsal line; this latter is more distinct on the posterior portion of the body, where it follows the peculiar pyramidal hump or prominence on the twelfth segment, as shown in the figure. The under surface of the body is pale green.

When full grown this caterpillar descends to the ground, and, drawing together some loose fallen leaves or other rubbish, spins within a loose silken cocoon, where in due time it changes to a dark, shining brown chrysalis, from which the moth usually escapes in the latter part of July; those which we have reared have appeared about the 20th of the month.

The moth, see figure 4, measures, when its wings are expanded, about one and three quarter inches. The fore wings are dark brown, shaded with paler brown, and with dots and wavy lines of a glossy grey or dull whitish hue. The hind wings are reddish with more or less of a coppery lustre; browner on the outer angle of the front edge of the wing, and paler towards the hinder and inner angle.—The body is dark brown with the hinder portion banded with lines of a paler shade. The under surface of the wings is much lighter in color than the upper.

Fig. 4.

In what stage of its existence this insect passes the winter months has not yet been determined. Whether the eggs, which are probably laid during August, remain dormant during the remainder of the summer and hatch early the following spring, or whether the eggs hatch into larvæ early in the fall, and the larvæ, while still young, become torpid and sleep through the long winter months, remains undecided; we incline, however, to the latter view.

Where the caterpillars prove troublesome their numbers may be lessened by jarring the trees or vines on which they are feeding with the hand, when they will usually drop to the ground, where, on account of their green color, they can be readily seen and destroyed.

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ON ANISOPTERYX VERNATA AND POMETARIA.

BY H. K. MORRISON, CAMBRIDGE, MASS.

There has been some confusion lately in regard to the limits and synonymy of these two common species, partially due to Dr. Harris' unsatisfactory reference to them in his "Report on the Insects of Massachusetts," 1841, and to the inaccessibility of Prof. Peck's original description of *A. vernata.*

In the numerous notes on these species and references to them in recent publications, they are in nearly all cases confounded together or wrongly determined; and I have not found them correctly named in a single collection which I have examined.

I reprint the descriptive portion of Prof. Peck's excellent essay. He was only acquainted with *vernata* and makes no reference to any other species. Dr. Harris considered *pometaria* the true "canker worm," and *vernata* a variety; on what grounds I do not know, as the latter is much the commoner, and, I presume, the most destructive. The following description of *vernata* was published in the Massachusetts *Magazine*, vol. vii, Sept. and Oct., 1795, and reprinted in 1827 in the New England *Farmer*, vol. v.:

"*Phalaena vernata, geometra geticornis, alis cinereis, fascii tribus obscuris, fuscis, posticis immaculatis, femina aptera.* The wings are ash color "with three obscure blackish transverse stripes, and a small dash of the "same color at the tip; the under wings are of a uniform color and "rather lighter than the ground color of the upper ones. The body of "the female is nearly four lines in length, ash colored and marked on the "back with a brown list extending from the thorax to the tail. In thirteen "days the females deposit their eggs; these are placed in the crannies of "the bark in the forks of small branches, and where there are spots of "moss upon the smaller limbs; they seem most fond of insinuating "themselves in the cavities between its leaves. For this purpose they "are furnished with a tube through which the egg is passed. The egg is "elliptic, one-thirtieth of an inch in length, of a pearl color with a "yellowish cast. The larvæ when full grown are about 9 lines long. The "head pale, marked on each side with two transverse blackish stripes, the

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"back ash colored, marked lengthwise with small interrupted dusky lines. "The sides blackish, with a pale line along the length of the body; there "are two white spots on the last segment of the body. The abdomen "beneath is ash colored. The chrysalis is about five lines long and one "and one-half lines in diameter, of a light hazel color, oblong and "pointed at one end. Their natural and regular time of rising is about "the middle of March, but happens earlier or later according to the "warmth or coldness of the season."

Dr. Harris described the male of what he considered the true "canker worm moth" as follows. The female he seems to have confounded with the females of *vernata*.

"The fore wings are ash colored, with a distinct whitish spot on the "front edge near the tip; these are crossed by two whitish, jagged bands "along the sides of which there are several blackish dots; the outermost "band has an angle near the front edge, within which there is a short, "faint, blackish line, and there is a row of black dots along the outer "margin close to the fringe. The hind wings are pale ash colored, with "a faint blackish dot near the middle. The wings expand about one "inch and a quarter. This species may be called *Anisopteryx pome-"taria*."

It has been thought that perhaps these two forms were the autumnal and vernal broods of the same species.

That the two species are entirely distinct, differing from one another in the most positive and unmistakable characters, has been abundantly shown by Mr. B. Mann in the Proceedings of the Boston Society of Natural History.

I give below the distinctive characters of the two species arranged in the most convenient form for comparison. It will be noticed that while the species resemble each other closely externally, the differences, particularly in the females, are in many cases structural.

Vernata, Peck.	*Pometaria*, Harr.
The first seven rings of the abdomen in both sexes bear each upon the back two transverse rows of stiff red spines, pointing towards the end of the body.	The first seven rings of the abdomen in both sexes with no spines upon the back.

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Fore wings of male ash colored or brownish gray, the whitish spot found on the fore wings of *pometaria* wanting.

Fore wings of male ash colored, with a distinct whitish spot on the front edge near the tip.

The whitish bands found on the fore wings of *pometaria* are wanting, but there is a jagged, submarginal white band on the upper side of the fore wings in most specimens.

Forewings crossed by two whitish jagged bands ; the outermost band has an angle near the front edge ; the whitish bands are sometimes obsolete, in which case only the whitish spot remains.

Three interrupted dusky lines across the fore wings, instead of two lines as in *pometaria ;* sometimes these lines are only indicated by dark spots on the costa and by blackish dashes at the crossing of the median nervure.

Along the sides of the whitish bands there are several blackish dots, each on a nervule, and all generally connected together by a dusky band which includes them.

There is an oblique black dash near the tip of the fore wings, also a distinct, nearly uniform, continuous black line before the fringe.

Within the angle of the outermost whitish band, near the front edge, there is a short, faint, blackish line, and there is a marginal row of black dots before the fringe.

The white band found on the hind wings of *pometaria* is wanting.

In most specimens a curved white discal band extending across the hind wings.

Abdomen of the female terminating in a retractile ovipositor rather acutely tapering behind.

Abdomen of the female without ovipositor, terminating bluntly.

Body and legs of the female clothed with whitish and dark brown dentate scales ; general coloration not uniform ; a black, dorsal, longitudinal, interrupted band on the abdomen ; a whitish patch on each side of the beginning of the band ; the spines often give a reddish tinge to the part they occupy.

Body and legs of the female smooth, clothed with glistening brown and white truncate scales intermixed, giving the body the appearance of uniform shining, dark ash color above, and gray beneath.

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In regard to the time of appearance of the species, *vernata* emerges in the spring (March and April). I have never seen a specimen taken in the autumn. It is by far the commoner of the two. *Pometaria* is not so common as *vernata*, and the great majority of specimens emerge in the fall or early winter, very rarely a few remaining over until the spring. The spring specimens of the male are very strongly marked, of a dark smoky brown, resembling somewhat in coloration the dark suffused variety of *Cleora pulchiaria*, Minot. Although I have searched particularly for them, I have never been able to take but two males. The females seem to be more common in the spring, and do not differ from the fall specimens.

I have examined 150 male, 70 female *vernata;* 40 male, 60 female *pometaria*, taken in the autumn, and 2 male, 10 female *pometaria*, taken in the spring.

NOTES ON THE LARVA OF BOARMIA LARVARIA, GUENEE.

BY THE EDITOR.

Several of the larvæ of this species were taken on the 24th of June; they were found feeding on willow and taken by beating the bushes over an umbrella.

Length one inch; body cylindrical.

Head medium-sized, flat, bilobed; brownish grey in front, a little darker at the sides, with a patch of brownish black on the summit of each lobe, and a few short brownish hairs; mandibles brownish black.

Body above reddish brown, smooth and glossy, having here and there a greenish tint, and with many fine longitudinal lines of a slightly darker shade scarcely visible without a lens. On each segment, from fifth to twelfth inclusive, there are two small black dots on each side of the dorsal line, and on sixth segment a black tubercle with a small patch of white at its base in front. On seventh, eighth, ninth, tenth and eleventh segments are similar black tubercles, but much smaller, with a whitish dot on the anterior part of the base of each, most distinct on tenth and eleventh

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segments. Twelfth segment with two scarcely raised black tubercles above, a short black streak on each side behind them, and a small whitish spot in front; terminal segment with a few very fine short brownish hairs. Spiracles small sub-oval, pale ringed with black.

Under surface similar to the upper, with the greenish tint a little more decided and a central stripe of greenish white widening between the two pairs of prolegs; each segment from fifth to ninth has several small black dots. Feet yellowish green, faintly ringed with black at their base; prolegs green, marked with reddish brown on the outside.

Two specimens entered the chrysalis state on the 25th of June; one produced the imago on the 9th of July, the other on the 12th. The moth was kindly determined for me by Dr. A. S. Packard, Salem, Mass.

A DISSERTATION ON NORTHERN BUTTERFLIES.

BY WILLIAM COUPER, MONTREAL.

The Swallow-tail Butterflies which occur on the Islands of Anticosti and Newfoundland, and on the north coast of the Gulf of St. Lawrence are at present a subject of dispute, both as to species and position among the Papilionidæ. Having some knowledge of their localities and geographical range, I venture to state my opinion on the matter.

When I first visited the south coast of Labrador, in 1867, a Swallow-tail butterfly was taken by me at Natashquan, where it was rare. I supposed it then to be a boreal variety or race of *Asterias*, and on my return to Quebec presented two or three specimens to the Rev. Mr. Innes, who had a collection of Lepidoptera among which were specimens of a smaller *Papilio*, which he informed me came from St. John's Newfoundland. Mr. Innes removed afterwards to London, Ont., and I heard no more of the Labrador or Newfoundland *Papilios* until Mr. W. Saunders described his *Papilio brevicauda* in "Packard's Guide." Mr. Saunders obtained his specimen through the kindness of Mr. Innes, who told him that he had received it from an officer who had been spending some time at St. John's. If the *Papilios* taken by me at Natashquan, Labrador were in Mr. Innes' cabinet when Mr. S. obtained the specimen described as *brevicauda*, did Mr. Innes point them out to Mr. S. in order to compare with those from Newfoundland? This primary question should be answered, because there is no evident difference between the *Papilio* of

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Anticosti and that of the Labrador coast.* Yet Mr. Saunders states (April 30th, 1873) "that he saw one of my Anticosti specimens at Mr. "Mead's, in New York, but did not feel at all satisfied that it was identi- "cal with his *brevicauda*. *Polyxenes* is Scudder's new name for *asterias*, "but he (Scudder) does not regard *brevicauda* now as identical with it."

I have tried to obtain a specimen of the Newfoundland *Papilio*, and communicated with a gentleman residing at St. John's, Newfoundland, asking him to procure specimens of this swallow-tail butterfly for me. He says: "In my opinion it is very rare in this district. During the last "three summers I have seen but one specimen, and some of my "friends here confirm the opinion regarding its rarity." That he has reason to believe that in other parts of the Island it is more abundant, as he has heard of it at Cod Roy, on the western coast, and Notre Dame Bay, in the north of the Island. He adds "that a Halifax "Entomologist has been enquiring for it on the south coast of the Island "for some time, without success."

I am confident that it becomes scarce as we proceed down the south coast of Labrador, towards the Straits of Belle Isle. The true *habitat* of the *Papilio* (specimens of which I gave Rev. Mr. Innes in 1867) is the Island of Anticosti, where it occurs more abundantly than in Labrador or Newfoundland. It is met with occasionally at Mingan, but more commonly at the mouths of rivers east of Seven Islands.

The description in "Packard's Guide" does not exactly correspond with the external markings of the Anticosti specimens, and I candidly state that I have never seen a butterfly whose general features are more uniform than in that of the latter Island.

Mr. Edwards, of W. Virginia, states that it is not related to *asterias*, but to *machaon* and *zolicaon*. In a letter from him, dated August, 1873, he thinks that the Anticosti *Papilio* is undoubtedly *brevicauda*, Saunders, whose description was taken from a single ♀, and the fulvous prevailed remarkably in the yellow spots. That the description of *brevicauda* fits one of the Anticosti ♀ exactly. He points out, however, wherein the Anticosti *Papilio* differs notably in two respects from *machaon*, or the American representative of that, viz., *P. Aliaska*, Scudder, and from *zolicaon*. 1st—the hind wings are black, while in the others from base to

* The specimen Mr. Innes gave me was from Newfoundland. He did not show me Mr. Couper's specimens.—ED. C. E.

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disc they are yellow. 2nd—the abdomen of the Anticosti species is spotted with yellow like *asterias*, while all the others have that part black with yellow lines, as in *turnus*. In a letter from Mr. Edwards, dated Sept. 1st, 1873, he says that "we had all been looking for affinity to *asterias*, while the butterfly belonged to another group. Strecker described it as a var. of *asterias*, and so Packard considered *brevicauda* a var. of *asterias*. In my synopsis I put the species down as a var. of *asterias*. It is many years since I saw the original *brevicauda*, and I have forgotten its appearance; but in reading over the description in Packard, I consider that the excess of fulvous is the only permanent distinction between the Newfoundland and Anticosti specimens." Mr. Grote agrees with Mr. Edwards that the *Papilio* collected in Anticosti is *brevicauda*, Saunders, but I think my memory serves me correctly when I state that the specimens of *Papilio* in Mr. Innes' collection from Newfoundland were considered distinct by the latter gentleman and myself, at that time. The Newfoundland specimens were smaller than those from Labrador; indeed, we looked on the St. John's butterfly as dwarfed, but the species was not then determined.

Not having access to all the forms constituting connecting groups of *Papilios*, I am not prepared to concur with the gentlemen who have classed it with *machaon* or *zolicaon*. At first view the Anticosti butterfly takes the characters of *asterioides*, Reakirt, and *asterias*, while the form has a mere approach to *machaon* and *zolicaon*. I suppose it is on account of the latter affinity that Mr. Edwards places it near *machaon* and *zolicaon*, but there are these notable differences between the Anticosti *Papilio* and *P. Aliaska*, Scudder, or *zolicaon*, viz., 1st, the hind wings are black and the *interior band* underneath is constant in form and number of spots, and the spots are not wedged into each other as in *zolicaon* or *asterias*. 2nd, the abdomen is spotted with yellow similar to *asterias* and *asterioides*, and in fact, in my judgment, the Anticosti *Papilio*, with the exception of the width of the macular band, is a prototype of *asterioides*, Reakirt, from Mexico. Constancy of marks on the wings and body of an insect, no matter to what order it belongs, is undoubtedly *bona fide* evidence of the stability of the species.

We have evidence of European insects introduced into this country becoming acclimatized and segregated in course of years, and a few of these which we now find holding a local existence on such islands as Anticosti and Newfoundland, may have in earlier times found it necessary

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to search for more congenial localities, there becoming attached to new food plants, which, no doubt, have an influence in diversity of colors. We have an instance of this in the American representative of *Vanessa antiopa*, which is of rare occurrence in Anticosti ; but where it retains the features of its English congener, while those taken in more southern latitudes assume a different coloration. Instance also the introduction of *Pieris rapæ* into Canada of late years. This species has now a struggle to exist in the latitude of Quebec, but so long as its food plant is abundant it will continue with us. It has been gradually moving south, where, with a more favorable climate, it propagates extensively. This butterfly also shows the effects of climate in the appearance of a yellow variety. It may be possible that the butterflies called *brevicauda* by Mr. Saunders and *Anticostiensis* by Mr. H. Strecker, had a similar origin. The connecting link or affinity of *Papilio brevicauda* with *asterias* is only a perplexing attempt to make the Anticosti form an ally of the continental *P. polyxenes*, which is Scudder's new name for *asterias*.

I cannot find sufficient reason for such connection, as there is quite a distinction between the larva of *asterias* and that of the Anticosti butterfly. It may, however, be discovered that an affinity occurs in *P. asterioides* and *brevicauda* or *Anticostiensis;* and although the former is found in Mexico, I see no reason to doubt their connection in years gone by.*

Considering the present rate of travel of *Pieris rapae* southwardly, it may during the course of another twelve years reach Costa Rica, and there change so much externally as to be claimed as another variety, while the Canadian form will still be called the segregated species. Mr. Hermann Strecker, of Reading, Penn., in his " Rhap. et Hetero." No. 6, page 48, gives the geographical distribution of *asterias* as follows :—" The " ordinary form, with but little variation, occurs from Canada to Florida," taking a southern range, while it extends west as far as Colorado. He considers *asterioides* to be the tropical form of *asterias*, that *brevicauda*

* NOTE.—"The insects of separate arctic regions have a great mutual resem- "blance, and the difference between them increases in the successive concentric "circles from the above regions towards the equator. It has been said that the "advance of the glacial period was accompanied by the migration of insects "southwards, and that the present distribution of insects was effected by the pre- "valence of this epoch, and by the succeeding temperate epoch."—*F. Walker, F. L. S., in Can. Ent., vol. iii, p. 148.*

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may be a segregated type peculiar to Newfoundland, while the species which he has named *P. Anticostiensis* is considered to be a sub-arctic form, peculiar to the Island of Anticosti and south coast of Labrador.

Messrs. Edwards and Strecker have given me considerable aid in forming the opinions which I now advance, and although the former states that the Anticosti *Papilio* is not related to *asterias* (as a group), the question of greatest import is as to whether it is connected with *asterias* and *asterioides* specifically.

Should the Newfoundland, Labrador and Anticosti *Papilios* turn out to be identical, I should hold that they are the segregated and original type, existing in their primitive concentric circle, and that the variations of *asterias*, which are now being discovered throughout the great extent of territory south and west of Labrador, are descended from the northern form, and that these varieties have changed by food and climatic influences. The northern *Papilio*, although differing in size, never varies in its coloration, and this peculiar feature of constancy constitutes the principal ground of my opinion. It may be discovered that the Newfoundland *Papilio* is different in some respects from those occurring in Labrador aud Anticosti, but the proof that such is the case is not thus far sufficient to disturb the theory advanced, that one is a race of the other.

(To be Continued.)

CORRESPONDENCE.

PARASITES.—I collected two dozen chrysalids of *Pieris rapae* about the second week in January. They were taken indiscriminately from under the coping of a wooden fence in this city. All these chrysalids were filled with the larvæ of a small parasite, probably *Pteromalus puparum*. I have counted ninety-five in one chrysalis. It occurs to me that chrysalids containing these parasites could be sent to a great distance during winter, and it would be interesting to learn their progress in localities where *rapae* does not occur. I am certain that Montreal can supply them in any number. Mr. Caulfield informs me that another small parasite came from a chrysalis of *Grapta progne*.—WM. COUPER, 67 Bonaventure Street, Montreal.

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DEAR SIR,—

On the 23rd and 24th of last July I caught 2 specimens of *C. philodice* ♀, of a white color, with a slight greenish shade, especially towards the inner margin of the hind wings. As these are the only times that I have happened to meet with this variety, I would like to know whether it is common or not.

About the end of July or the beginning of August last, I caught a very battered butterfly which closely resembles *L. ephestion*, Stoll., except that it has a row of white spots crossing the front wings and following very much the same direction as the outer edge of the white band of *L. arthemis*. The white spots are better defined on the under than on the upper side. The orange spots also on the front wings are very small and indistinct. Is this a distinct species or only a variety of *L. ephestion*?

Last year there was a second brood of *L. ephestion* at Portland, which appeared about the end of August. I believe that this is the first time within the last six years that this has occurred there. There appeared also, about the same time, a pretty plentiful supply of *G. comma*. These I constantly found alighted on the warm, sandy road, which they appeared to prefer to all floral attractions.

Within the last four or five years I have not been able to obtain a single specimen of *C. cardui* in the vicinity of Portland, though formerly they were quite common.

C. atalanta has also greatly decreased in numbers within the last two or three years. In 1872, out of 20 or 30 caterpillars which I tried to rear, only one arrived at maturity, most all the rest being infested with parasites.

Yours, &c.,
H. H. L., Montreal.

ANNUAL MEETING OF THE LONDON BRANCH.

The annual meeting of the London Branch of the Entomological Society of Ontario was held at the residence of Mr. W. Saunders, on the 17th of February.

A goodly number of members were present, and the following officers were elected for 1874: President, A. Puddicombe; Vice-President, H. P. Bock; Secretary-Treasurer, J. G. Geddes; Curator, J. Williams; Auditors, Messrs. C. Chapman and J. Griffiths.

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A box of Lepidoptera from Miss Carey, of Amherstburg, was shown by Mr. E. B. Reed, containing some interesting specimens taken in that locality; among others there were fine examples of *Papilio thoas* and *Philampelus satellitia.*

W. Saunders exhibited a box of Coleoptera, embracing a large number of species kindly donated by Theodore L. Mead, Esq., of New York. Also, several boxes of European insects, presented by Francis Walker, Esq., of the British Museum. The Secretary was instructed to tender to Mr. Walker the sincere thanks of the Society for his continued liberality in this matter—the cabinets of the Society and those of the members also having been repeatedly enriched with valuable specimens through his kindness.

OBITUARY.

Dr. LeConte announced the death, at Davidsburg, York Co., Pa., on the 10th March, of Friedrich Ernest Melsheimer, M. D., a correspondent of the Academy, aged nearly ninety-one years. He inherited great taste for entomology from his father, E. F. Melsheimer, a clergyman, who cultivated natural science with much success, and not only was a highly esteemed correspondent of Knoch and other European entomologists of the end of the past and beginning of the present century, but an active collaborator with Say, the founder of descriptive entomology in the United States.

Dr. Melsheimer thus inheriting the tastes and the collection of his father, has preserved, for later investigators, the only authentic types of many of Mr. Say's species; and has also contributed no small proportion of the descriptions of Coleoptera, which appeared up to February, 1847. His memoirs on this subject, containing notes and descriptions of about four hundred and fifty-seven species, were printed in the 2d and 3d vols. of the proceedings of this Academy.

Entomology also owes to him the catalogue of the described Coleoptera of the United States, which, after revision by Prof. S. S. Haldeman and myself, was published by the Smithsonian Institution in 1853. It was the first work of bibliographical importance in the modern history of that branch of science, and gave a powerful impetus to its developement in the United States, and has greatly diminished the labor of those who have continued the study of that department.

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Living an isolated life on his farm, remote from usual lines of travel, dependent almost entirely on letters for the sympathy and counsel of his fellow students, separated from libraries containing the results of modern research, and therefore dependent on the traditional knowledge received from Europe, which constituted in fact most of the intellectual capital of the founders of natural history in the United States, Dr. Melsheimer must be considered as a very remarkable instance of one who, with very limited opportunities, has worked honestly, to the extent of his abilities, to develop the powers of usefulness which were given him.

Modest, unpretending, affectionate to his family, devoted to his friends, industrious to the limit of human usefulness, his death, at such an advanced age, can only leave, with those who have enjoyed his acquaintance, a satisfaction that they have known so good a representative of the purer qualities of humanity.—*Proc. Acad. Nat. Sci., Phil.*

BOOKS RECEIVED.

First, second and third Annual Reports of the United States Geological Survey of the Territories for 1867, 1868 and 1869, 8vo., pp. 86. From F. V. Hayden, U. S. Geologist.

Sixth Annual Report of the United States Geological Survey of the Territories, embracing portions of Montana, Wyoming and Utah, for the year 1872, By F. V. Hayden, U.S. Geologist, 8vo., pp. 844, with numerous illustrations.

Contributions to the Extinct Vertebrate Fauna of the Western Territores. By Joseph Leidy, from the U. S. Geological Survey, Washington, D. C

Acrididæ of North America. By Cyrus Thomas, Ph. D., from the U. S. Geological Survey, Washington, D. C.

Catalogue de Livres D'Histoire Naturelle. De E. Deyrolle Fils 23, Rue de la Monnaie, Paris.

The Scottish Naturalist, January, 1874.

Science Gossip, January, 1874.

Nature, to January 22, 1874.

Canada Farmer, to Feb. 2, 1874.

Indiana Farmer, Jan., 1874.

Contributions to Entomological Bibliography, up to 1862. By Albert Muller. No. 3.

Newman's Entomologist, Nov. and Dec., 1873; Jan,, 1874.

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VOL. VI. LONDON, ONT., MARCH, 1874. No. 3

DESCRIPTION AND HABITS OF A SUPPOSED NEW SPECIES OF LEPIDOPTEROUS LARVA OF THE GENUS SPHINX.

BY THOMAS G. GENTRY, GERMANTOWN, PA.

Des.—Body cylindrical, tapering gradually anteriorly, 12-jointed, exclusive of head. Head sub-elliptical, thickly punctured, moderately pubescent and of a yellowish brown color. Oral appendages largely developed. Antennæ 3-jointed, cylindrical, acuminate, the basal joint very long and quite thick. A dark purplish curved band passes from the crown of the head to the right antenna. Prothoracic segment surmounted by a transversely elongated, punctated, corneous saddle, concolorous with the head.

General color dark purple, relieved by two series of dorso-lateral gold-colored dots, ranging from the posterior half of the metathoracic to the seventh abdominal segment (each series containing twenty-seven points). The anterior half of the second, to the seventh abdominal segments inclusive, each furnished with a single, much larger, similarly colored one. Above the line of the prolegs, intermediate between this and that of the spiracles, on each side, is a row of irregularly shaped yellow spots.

True legs moderately elongate, acuminate, 3-jointed and yellowish brown in hue, the tarsal joint being armed with a short, recurved, black claw: the whole slightly invested with short black hairs. The membraneous legs of the 3rd, 4th, 5th and 6th abdominal segments cylindrical, thickish, abruptly truncate at base, and clothed with short reddish brown hairs, and armed on the inferior aspect interiorly with a double row of stiff, ferruginous hairs, for adhering to objects. Anal pro-

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leg sub-quadrangular, warty and pubescent, and surmounted by a triangular supra-anal plate of a dark purplish color, with the apex directed posteriorly.

Prothoracic and first and abdominal rings are furnished each with a pair of transversely oval, yellowish spiracles. Inferior aspect of the larva is marked with clusters of white spots, relieving the monotony of the purple. Last abdominal segment surmounted by a moderately long recurved horn, yellowish brown in color, and bearing scattered gland like bodies, which manifest a tendency to become spines. Length nearly 3 inches. Taken in Germantown during the first week of September, while feeding upon the leaves of *Polygonum pennsylvanicum.*

This larva, belonging, as it does, to the family Sphingidæ, is undoubtedly rare, as it is the only one that I have met with in all my entomological rambles; nor can I find in any of the works at my command a description, still less a figure thereof. In some respects it resembles the full-grown larva of *Sphinx euphorbia*, described and figured in "Transformation of Insects," by Dr. Duncan; in others it differs very materially therefrom. In the Euphorbia Sphinx the yellow points are scattered promiscuously over the dorsal and lateral surfaces of the body, but in the specimen under consideration they are arranged with some view to order. There is a still further resemblance in the irregular spots which flank the sides, just beneath the line of stigmata, and in the general color, the former being black, and the latter a rich dark purple. It differs from the former in being devoid of the three longitudinal lines of carmine tint, which is a prominent feature of it, and also in being more tapering anteriorly.

There is one character in the life history of this larva which struck me as peculiarly novel and interesting, and which deserves to be placed upon record. Instead of assuming the peculiar Sphinx-like attitude in a state of rest, (whence the popular name of Sphinx is derived), and which is so familiar to entomological students as well as the outside world, it curves its body, bringing the head and tail in close proximity, reminding one of the position which is so easily and readily taken by the larva of *Cimbex ulmi*, Reek.

It cannot be denied that this is its natural posture in a state of inaction. To assure myself that a position which seemed so natural and easy to the worm was not an occasional one, I was permitted in the

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intervals of relaxation and freedom from duty, to give it prolonged and careful attention for many consecutive days. In not a single instance did it assume the attitude so eminently characteristic of the Sphinx family.

One other peculiar trait of its nature it was my happy fortune to observe. Caterpillars, as is well known, have a variety of ways for defending themselves against the annoyances and assaults of their enemies. While some are provided with hairs which act as irritating causes when brought into contact with highly sensitive surfaces, others are furnished with fearful looking spines which infuse a feeling of horror into their enemies, even when they have not the power to act as irritants. This species, presenting an almost perfectly smooth bodily surface, assuredly makes up from its lack of integumentary appendages, in being armed with a pair of powerful tridentate mandibles, which it uses freely and indiscriminately.

Hundreds of Lepidopterous larvæ have been handled with impunity by the writer, and this new method of self-defence, even where manifested, has been so slight as not to attract much attention. In this case the insect seemed unwilling to permit any familiarities. The softest touch of the finger was sharply resented. On one occasion the writer's finger was seized and held on to with such pertinacity, as to require considerable effort at extrication. The smart from this squeezing lingered for many minutes afterwards—a suitable punishment for his temerity. Even when laid upon the palm of the hand it continued its rapid twitchings from side to side, and with gaping jaws, as if still conscious of hidden danger, ready to vent the full measure of its infuriated passion upon anything that should come within their scope.

In conclusion, I am sorry to say that my *vivarium* having been unduly tampered with during my absence, this caterpillar, which was always exceedingly restless under confinement, effected its escape. On the discovery of the fact dilligent search was commenced, but no clue to its whereabouts could be obtained—it, doubtless, like many of its unfortunate kind, having become a rich morsel for some insect-loving bird. I trust to be able during the gradually approaching season to secure similar larvæ and bring them to the imago or moth condition.

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HESPERIA PAWNEE. *N. sp.*

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Male expands 1.45 inches. Primaries above fulvous. Subcostal, submedian and subdorsal veins black at the base. Stigma black and conspicuous, followed by a dusky shade. A small black line at the extremity of the disk is preceded by a yellowish white or semi-transparent spot in the disk; a similar spot, triangular in shape, appears between the first and second median veinlets at their divarication, and two others between the sixth and seventh subcostal veinlets. The outer margin is broadly bordered with brown, which is finely powdered with fulvous scales toward the apex.

Two nearly square fulvous spots between the last subcostal and first median veinlets, separate an oval brown patch that lies at the extremity of the disk, from the border. Costal edge blackish. Fringe white, dusky toward the apex.

Secondaries fulvous, bordered with brown; broadly and darkest along the anterior edge, narrowly on the outer edge, where it appears as cuneiform spots between the veinlets, and broadly again along the inner edge, where it is sprinkled with fulvous. Most of the veins on both wings are black. Underside of both wings pale yellow. Primaries black at base, having a black line corresponding to the stigma.

Inner margin brown, preceded by a large whitish patch. Five pale whitish spots near the apex, another in the disk, and one between the first and second median veinlets. Fringe white at the anal angle, brown tipped with white at the apex. Secondaries have a whitish spot in the disk, and are crossed by a nearly straight row of small whitish spots. Head and thorax greenish yellow. Body black. Abdomen, breast and palpi yellowish white. Antennæ black and yellow above, white tipped with chestnut below.

The spots on the underside of secondaries sometimes obsolete.

♀ light brown above, with a slight purplish reflection. Primaries sprinkled with fulvous scales near the base and inner angle. There is a large, square, white spot in the disk, and an unequal, curved row of nine white spots extend from the costa—beginning about two-tenths of an inch from the apex—to the submedian vein. The first three spots are narrow

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and equal, the fourth and fifth are small and square and lie nearest the outer edge of the wing, the sixth is larger and triangular, the seventh largest and square, the eighth and ninth are irregular in shape and partly fulvous.

Secondaries darkest along the anterior margin. A curved row of five whitish yellow spots, of which the second and third are longest, crosses the wing beyond the disk, and in the disk is a small yellow spot. A yellow streak precedes the last median veinlet, running to the outer margin. Fringe of all the wings white. Below, on the primaries, the same white spots appear as above, except that the eighth and ninth are merged in a large whitish patch situated as in the male. A brown patch covers part of the base and inner margin, and extends to the center of the wing. On the secondaries three small white spots appear near the apex. The ground color of both wings is yellowish white, most deeply tinged with fulvous near the costal border of the primaries. Fringes white. Head, thorax and body brown above. Abdomen and palpi white. Antennæ black above, whitish tipped with red below.

This species was taken at Glencoe, Nebraska, upon high rolling prairie, from the first to the middle of September.

The writer can exchange a few males for United States diurnals, with those desirous of seeing the types.

LIST OF NEUROPTERA

COLLECTED BY J. PETTIT, GRIMSBY, ONT.

Psocus striatus,
Pteronarcys biloba?
Calopteryx maculata,
Lestes rectangularis,
" forcipata,
" unguiculata,
Agrion saucium,
" irene,
" ineis,
Aeschna constricta,
Plathemis trimaculata,
Libellula luctuosa,
Libellula 4-maculata,
" pulchella,
" semifasciata,
Diplax intacta,
" rubicundula,
Chauliodes pectinicornis,
" maculatus,
" angusticollis,
Polystoechotes punctatus,
Myrmeleon obsoletus,
Panorpa rufescens.

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ON SOME OF OUR COMMON INSECTS.

13. *THE DISIPPUS BUTTERFLY—Limenitis disippus*, Godt.

BY THE EDITOR.

In the annual report of the Entomological Society of Ontario, for 1872, this insect is referred to at some length, and from the material there given much of the following has been condensed. In the perfect or winged state it is tolerably common throughout Ontario, and in this condition it very closely resembles our common red or *archippus* butterfly, see CAN. ENT., vol. v, p. 4, from which, however, it may always be distinguished by its smaller size and by a black band which crosses the hind wings, which band is entirely wanting in the *archippus*.

Fig. 5 represents the *disippus* butterfly. The ground color of the wings is a warm orange red, with the veins heavy and black, and the margins spotted with white. In the figure the left wings represent the upper surface, while those of the right, which are slightly detached from the body, show the underside; the two surfaces differ but

Fig. 5.

very little in color or markings. The butterfly appears on the wing rather late in the summer, when it may frequently be seen hovering about willow bushes, on which the female usually deposits her eggs, that being the favorite food plant of the larva.

The egg, which is well shown in fig. 6, is a very beautiful object; *a* represents it highly magnified, while at *c* it is shown of the natural size and in its usual position on a willow leaf. At *d* one of the minute cells

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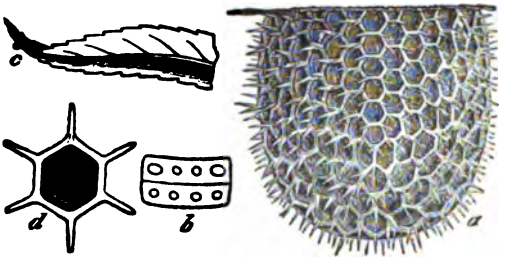
of the egg is shown still more highly magnified. Mr. C. V. Riley, who was the first to describe this egg, says that at first it is of a pale yellow color, but that it soon becomes gray as the enclosed larva develops. The

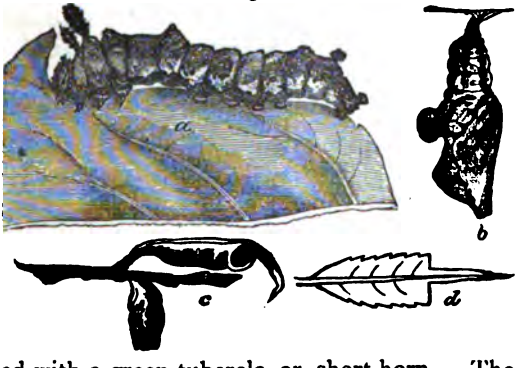
Fig. 6.



eggs are usually deposited singly near the tip of the leaf, generally on the under side, although sometimes on the upper, and occasionally two or even three are placed together.

In a few days the young larva appears. As it issues from the egg it measures only one-tenth of an inch long, has a large yellowish brown head, and a pale yellowish brown body, the latter with darker streaks and a few pale dots and warts, the warts having pale spines or bristles issuing from them. The larva attains full growth in about one month from the time of hatching, when it appears as shown at *a*, fig. 7. It is then about one inch and a quarter long, with a rather large head, which is flattened in front and divided by a central depressed line into two lobes, each of

Fig. 7.



which is tipped with a green tubercle or short horn. The head is of a pale green color, with two dull white lines down the front, and roughened with a number of small green and greenish white tubercles.

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The body above is of a deep, rich green color, with patches and streaks of dull white; the second segment is smaller than the head, and thickly covered with whitish tubercles; the third segment, which is dull whitish green, is raised considerably above the second, and has a flat ridge above with a long brownish horn on each side of it thickly covered with very short white and brown spines; the fourth segment has a similar ridge, with a small tubercle on each side, each tipped with a bunch of short whitish spines. All the segments behind the fourth have two tubercles, one on each side, of varying size and in a line with the long horns on the third segment, each being covered with a cluster of whitish spines. The tubercles on seventh, eighth, tenth and eleventh segments have a streak of white at their base, and each segment behind the fourth, excepting the ninth, has several smaller tubercles of a bright blue color. A large whitish patch covers nearly the whole of the ninth and parts of the eighth and tenth segments, and another of a similar character covers the second, third and part of the fourth. A white stripe extends along each side, close to the under surface, from the fifth to the terminal segments, in which is set a small cluster of whitish spines about the middle of each segment, from the sixth to tenth inclusive. On each side of the seventh, eighth and tenth segments is an elongated blackish spot, just above and behind the spiracles; the latter are rather large, oval, and of a brownish black color.

The under side is whitish green, with a central dull white stripe on the hinder segments; the feet are brown, ringed with brownish black; the prolegs pale greenish, faintly tipped with brown.

The chrysalis, fig. 7, *d*, has a curious mixture of colors—brown, grey, flesh color and white—and is characterized by a remarkable, thin and almost circular projection sticking out from the middle of its back, which has been likened to a Roman nose.

There are two broods of this insect during the year; the larvæ of the second brood scarcely attain half their growth when they hybernate, and complete their developement the following spring. On the approach of inclement weather the little caterpillar constructs a curious case in which to dwell, see *c*, fig. 7, which has been likened to the leaf of a miniature pitcher plant; having first, by means of silken cords, firmly secured the stem of the leaf it uses to the twig on which it grows. These cases are frequently found upon willow bushes, and also on the American poplar during the winter season.

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This butterfly is subject to the attack of several parasites ; one a tiny dark four-winged fly, infests the eggs ; another four-winged fly of a larger size, and a still larger two-winged fly attack the insect in its caterpillar state.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

Continued from Page 11, vol vi.

ERRATA.—Ante v. 5, p. 229, for *Laruna* read *Laverna*.

DRYOPE, *gen. nov.*

Primaries lanceolate ; the costa enters the margin about the middle discal cell narrow and closed by a nearly straight discal nervure. The subcostal sends off a long curved branch from about its middle, and which attains the margin behind the end of the cell. From the end of the cell the subcostal bends somewhat obliquely upwards to the costal margin. The median is furcate from the end of the cell, both branches being short and bending somewhat suddenly downwards to the dorsal margin, the inner branch being straight and continuous with the discal vein. The discal vein emits five branches, the superior going to the costal margin, the next furcate before the tip with one of the branches to each margin ; the three others go to the dorsal margin.

Secondaries narrowly lanceolate, costal vein short, subcostal very long, simple, attaining the costal margin near the tip ; cell unclosed ; median vein with three nearly equidistant branches. No discal vein but an independent branch which arises near the median and attains the dorsal margin before the apex.

Head smooth ; vertex short and broad ; forehead obtusely rounded ; face smooth, narrow and much retreating ; tongue long, clothed at the base. No maxillary palpi ; labial palpi short, porrected, densely scaled, almost tufted beneath ; no ocelli ; eyes large, but partly concealed by some long scales pendant from the swollen basal joint of the antennæ, which are about two thirds as long as the primaries, with the joints closely set and microscopically pubescent.

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This genus must approach closely to *Chauliodus*, Treit., but I can not reconcile either Mr. Stainton's or Dr. Clemens' diagnosis of the genus with the characters of this insect as to the labial palpi and neuration, nor do I discern any tooth-like projections of scales along the inner margin of the primaries. In ornamentation, too, the insect evidently approaches *C. canicinctella*, Clem. closely, though evidently distinct from it.

D. Murtfeldtella. N. sp.

Head, palpi, thorax and basal third of the primaries pale yellowish, the remainder of the primaries being of the same general hue, but darker and more reddish, the line between the two shades distinct (that is, they do not pass gradually into each other).

Al. ex. ½ inch. Kentucky in June. Also, received from Miss Mary E. Murtfeldt, of St. Louis.

In many specimens (which should, perhaps, be regarded as a distinct species) the colors are much more distinct, and the hue varies somewhat, the basal portion of the primaries having a pinkish cast and the remainder more of a brownish purple : some of the scales in the apical part of the wing tipped with hoary or pale yellow ; these specimens are also decidedly larger than the others.

OENOE, *gen. nov.*

Head and face rough, the tuft projecting in front ; tongue short, concealed by the palpi ; maxillary palpi long, folded ; labial palpi drooping, the second joint one-third longer than the third, and with projecting bristles at the apex ; eyes globose ; no ocelli ; antennae nearly two-thirds as long as the wings, filiform ; the terminal joints with the scales arranged in whorls, and the basal joint with a few long hair-like scales depending over the eyes.

Anterior wings lanceolate ; discal cell closed by a straight discal nervure ; costal vein short ; the subcostal from before the middle sends a branch to the margin behind the middle ; another short branch behind the middle, from the end of the cell, is slightly bent upwards to the margin ; the discal vein emits two branches from a common point : the upper branch attains the costal margin, the second branch sends a branch to the dorsal margin and becomes furcate before the tip, delivering a

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branch to the costal and one to the dorsal margin. The median divides into two branches at the end of the cell, both branches going to the dorsal margin ; submedian simple, rather long.

Posterior wings linear lanceolate ; the costal margin is excised from about the middle to the tip ; the costal vein attains the margin at the excision ; the subcostal is nearly straight and attains the margin at about the apical fourth ; discal cell unclosed ; a disco-central nervule is faintly indicated through the cell, becoming distinct in the apical half of the wing, when it sends two branches to the dorsal margin and attains the costal margin just before the apex ; the median vein is coincident with the dorsal margin from the basal third to beyond the middle.

This genus is nearly allied to *Eudarcia*, *Diachorisia*, but especially to *Hybroma*, Clem., differing, however, from all somewhat both in the trophi and neuration.

O. hybromella. N. sp.

Palpi brown and silver gray intermixed ; head yellowish white ; antennæ grayish fuscous, becoming more silvery towards the tip ; thorax and basal half of the forewings maroon brown, with darker brown scattered scales and small spots ; remainder of the wing white, with scattered brown scales which upon the costa and in the apical portion of the wing are condensed into loose, rather large, irregular blotches. *Alar ex.* ⅓ inch. Kentucky.

PERIMEDE, *gen. nov.*

This insect is allied to *Stilbosis*, Clem., *Laverna*, &c. It was captured in my library, where it had most probably escaped from some of my breeding cages, but I can give no account of its larval history.

No maxillary palpi ; labial palpi slender, rather sparingly scaled, reaching the vertex, widely divergent ; antennæ faintly pectinated, more than half as long as the wings ; basal joint suddenly clavate towards the tip. Head and face smooth, with the scales appressed ; face rather broad.

Wings long and narrow, with long ciliae.

Primaries longer than the body, narrowly lanceolate. Discal cell closed, the discal vein giving off one branch to the posterior margin near the tip. The costal is very short. The subcostal sends two branches to

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the margin before the end of the cell, one from the end of it and one behind the cell, and attains the margin just before the tip. The median sends three branches to the dorsal margin. (Probably the discal branch above mentioned should more properly be considered the terminal portion of the median and the discal described as having no branches.) Submedian simple.

Secondaries linear lanceolate. The costal vein is very long and close to the margin; the subcostal attains the tip, its basal half being obsolete. Discal cell unclosed; median sub-dividing into four equidistant branches, the first of which attains the dorsal margin before the middle, and the last one not far from the tip.

Imago long, slender, and the single species described below has small raised tufts of scales upon the primaries.

P. erransella. N. sp.

Antennae grayish brown; face and palpi pale grayish, tinged with purple; primaries grayish brown, tinged with purple, with three small spots of raised black scales, the two first of which are margined behind and the third one before with pale ochreous; one of these tufts is near the dorsal margin before the middle, one about the middle of the disc, and one at the end of it. Under surface and legs whitish, with four distinct dark brown spots on each side of the abdomen, and the joints of the legs gray brown. *Al. ex.* nearly ½ inch. Kentucky.

LIST OF COLEOPTERA OF ST. LOUIS COUNTY, MISSOURI.

BY S. V. SUMMERS, M. D., NEW ORLEANS,

(Continued from Page 192, Vol. v.)

EUAESTHETUS, *Grav.*
americanus, *Er.*
OXYPORUS, *Fab.*
vittatus, *Grav.*
OSORIUS, *Latr.*
latipes, *Er.*

BLEDIUS, *Steph.*
semiferrugineus, *Lec.*
troglodytes, *Er.*
pallipennis, *Er.*
fumatus, *Lec.*
nitidicollis, *Lec.*

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BLEDIUS, *Steph. (continued)*
annularis, *Lec.*
analis, *Lec.*
OXYTELUS, *Grav.*
insignitus, *Grav.*
sculptus, *Grav.*
nitidulus, *Grav.*
PLATYSTETHUS, *Mann.*
americanus, *Er.*
TROGOPHLOEUS, *Mann.*
morio, *Er.*
insculptus, *Fauvel.*
ANTHOPHAGUS, *Grav.*
brunneus, *Say.*
ACIDOTA, *Steph.*
subcarinata, *Er.*
OLOPHRUM, *Er.*
rotundicolle, *Er.*
emarginatum, *Er.*
LATHRIMAEUM, *Er.*
sordidum, *Er.*
CORYPHIUM, *Steph.*
notatum, *Lec.*
GLYPTOMA, *Er.*
costale, *Er.*
LISPINUS, *Er.*
laevicauda, *Lec.*

HISTERIDÆ.

HOLOLEPTA, *Payk.*
fossularis, *Say.*
HISTER, *Linn.*
binotatus, *Lec.*
interruptus, *Beauv.*
depurator, *Say.*
abbreviatus, *Fab.*
americanus, *Payk.*
bimaculatus, *Linn.*
carolinus, *Payk.*
lecontei, *Mars.*
immunis, *Er.*
foedatus, *Lec.*
harrisii, *Kirby.*
sedecimstriatus, *Say.*
PHELISTER, *Mars.*
subrotundus, *Mars.*
vernus, *Mars.*
TRIBALUS, *Er.*
americanus, *Lec.*
EPIERUS, *Er.*
pulicarius, *Er.*
regularis, *Lec.*
BACANIUS, *Lec.*
punctiformis, *Mars.*
DENDROPHILUS, *Leach.*
punctulatus, *Lec.*
PAROMALUS, *Er.*
affinis, *Lec.*
bistriatus, *Er.*
conjunctus, *Lec.*
SAPRINUS, *Leach.*
assimilis, *Er.*
seminitens, *Lec.*
patruelis, *Lec.*
fraternus, *Lec.*
ACRITUS, *Lec.*
politus, *Lec.*
fimetarius, *Lec.*
exiguus, *Lec.*

SCAPHIDIIDÆ.

SCAPHIDUIM, *Oliv.*
piceum, *Mels.*
4-guttatum, *Say.*

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SCAPHIDIIDÆ *(continued).*

CYPARIUM, *Er.*
flavipes, *Lec.*
SCAPHISOMA, *Leach.*
convexum, *Say.*
suturale, *Lec.*
TOXIDIUM, *Lec.*
gammaroides, *Lec.*
compressum, *Zimm.*

TRICHOPTERYGIDÆ.

TRICHOPTERYX, *Kirby.*
haldemani, *Lec.*

PHALACRIDÆ.

PHALACRUS, *Payk.*
politus, *Mels.*
OLIBRUS, *Er.*
apicalis, *Lec.*
OLIBRUS, *Er. (continued.)*
nitidus, *Lec.*
bicolor, *Er.*
pusillus, *Lec.*

NITIDULIDÆ.

CERCUS, *Latr.*
abdominalis, *Latr.*
COLASTUS, *Er.*
truncatus, *Lec.*
morio, *Er.*
semitectus, *Er.*
CARPOPHILUS, *Leach.*
pallipennis, *Lec.*
hemipterus, *Steph.*
antiquus, *Mels.*
luridus—
CONOTELUS, *Er.*
obscurus, *Er.*
EPURAEA, *Er.*
helvola, *Er.*
vicina, *Lec.*
NITIDULA, *Fab.*
bipustulata, *Fab.*
ziczac, *Say.*
PROMETOPIA, *Er.*
sexmaculata, *Er.*
OMOSITA, *Er.*
colon, *Er.*
PHENOLIA, *Er.*
grossa *Er.*
STELIDOTA, *Er.*
geminata, *Er.*
octomaculata, *Lec.*
AMPHICROSSUS, *Er.*
ciliatus, *Er.*
PALLODES, *Er.*
silaceus, *Er.*
CRYPTARCHA, *Shuck.*
ampla.
IPS, *Fab.*
fasciatus, *Say.*
4-signatus, *Say.*

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MONOTOMIDÆ.

BACTRIDIUM, *Lec.*
nanum, *Lec.*

MONOTOMA, *Hbst.*
americanum, *Aube.*

TROGOSITIDÆ.

NEMOSOMA, *Latr.*
cylindricum, *Lec.*
TEMNOCHILA, *Westw.*
viridicyanea, *Lec.*
virescens, *Er.*
ALINDRIA.
cylindrica, *Er.*
teres, *Lec.*

TROGOSITA, *Oliv.*
mauritanica, *Oliv.*
corticalis, *Mels.*
dubia, *Mels.*
nana, *Mels.*
castanea, *Mels.*
laticollis, *Horn.*
bimaculata, *Mels.*

COLYDIIDÆ.

DITOMA, *Ill.*
quadriguttata, *Lec.*
SYNCHITA, *Hellwig.*
granulata, *Say.*
nigripennis, *Lec.*
AULONIUM, *Er.*
parallelipipedum, *Er.*

PROLYCTUS, *Zimm.*
exaratus, *Mels.*
CERYLON, *Latr.*
unicolor, *Lec.*
castaneum, *Say.*

A DISSERTATION ON NORTHERN BUTTERFLIES.

BY WILLIAM COUPER, MONTREAL.

(Continued from Page 37).

The confinement of the genus *Chionobas* to high latitudes affords an example regarding distribution of species. Their food being lichens peculiar only to the Alpine regions, must confine them within a limited range. Mr. Scudder, in his "Revision of the hitherto known species of the genus *Chionobas*, of North America"—Proceed. Ent. Soc. Philad., vol. 5, pp. 26-28—gives them three or four localities; but these are either arctic, sub-arctic or Alpine. He places them also in Alpine districts—on

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high mountains in temperate latitudes in Europe and America. Mr. Scudder asks "what relations of structure do the species of these different localities and varying range of habitat bear to one another?"

Specific relations are just what we want to have elucidated, but it is difficult to obtain material for this work while butterflies of the genus *Chionobas* are confined to frigid, unaccessible localities. Mr. Scudder deserves the gratitude of entomologists for his able Revision of the *Chionobas*, and in defining the species known to occur in our Northern and Alpine regions. I may here remark that I did not see a species of this genus during my two visits to Anticosti, and I cannot account for their absence from the island.

After returning from Labrador in 1867, I sent Mr. Scudder ♀ specimens of a *Pieris* taken on the south coast of the Lower St. Lawrence, at Natashquan. His answer, dated Oct. 1st, 1867, is as follows: "*Pieris:* "I am inclined to think this is *P. frigida*, Scudd., described from Upper "Labrador, but I cannot be positive without seeing some ♂ ♂ from your "collection." I had no ♂ ♂ at that time, and therefore could not send them; but I took it for granted that the species was his *Pieris frigida.*

I made a subsequent collection on the Island of Anticosti and Labrador, in 1872, and captured a number of the above *Pieris* at Fox Bay, as well as on the south coast of Labrador. The specimens were distributed to my subscribers under the name of *P. frigida*, according to Mr. Scudder's determination. The gentlemen receiving the species (all reputed entomologists) did not doubt that it was anything else than Scudder's *P. frigida* until my return from Anticosti this year. I am now informed by Mr. Grote that the *Pieris* is not *frigida*, but *Ganoris oleracea* var. *borealis.*

Now, I have before me Mr. Scudder's paper in Proceed. Boston Soc. of Nat. Hist., vol. viii, Sept., 1861, in which I quote as follows:

"*Pieris oleracea*, Boisd.
"*Pontia oleracea*, Harris.
"*Pieris cruciferarum*, Boisd.
"*Pontia casta*, Kirby.

"The butterflies described by Harris, Boisduval and Kirby under the "above-mentioned names are one and the same insect. It is found "inhabiting the northern and eastern portions of North America, reaching "rarely as far south as Pennsylvania, and extending eastward to Nova

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"Scotia, at least as far west as Lake Superior, while in the North it is "found as high as the Great Slave Lake in the Hudson Bay Company's "territory, and even, according to Kirby, to Latitude 65° N. on the "McKenzie River."

I have now the mortification of finding that my Anticosti specimen of what I claim to be a *Pieris* is now *Ganoris oleracea;* but a var. to be called *borealis.* Mr. Grote says that the species resembles *frigida*, but that the peculiar elongated wings of *frigida* are wanting.

With a knowledge of the history of the Anticosti *Pieris* or *Ganoris*, whichever it may be, I am prepared to state that the former does not agree with the habits of *Pieris oleracea*, which is double brooded in Canada and quadrupled in the south, while that of Anticosti has but one brood during the season.

The egg of *oleracea* is pear-shaped or oval, of a yellow green color, and ribbed longitudinally with about fifteen sharp edged lines. The eggs are deposited singly, rarely more than one on a leaf, on the *underside.* The egg of the Anticosti *Pieris* is not pear-shaped, but oblong, pointed at each end, flesh colored, smooth and without ribs. The insect never deposits eggs underneath the leaves, but on the upper surface of its food plant *(Turritis stricta)*, and I have counted six on a single leaf. The caterpillar of the Anticosti *Pieris* is also different from that of *oleracea.* It approaches the color of that of *P. rapæ,* but without dorsal or lateral stripe, and is pubescent. In fact, it is as different from *oleracea* as the caterpillar of the latter is from *rapæ.* It occurs to me that the argument I have advanced regarding the *Papilio* of the Island applies also to this Anticosti *Pieris.* I find that after examining a number, with few exceptions, the colors are constant; and I cannot agree with Mr. Scudder that the upper surface is "supplied with obsolete spots similarly situated to "those on the upper surface of *P. rapæ* of Europe."

It is possible that the *Pieris oleracea* of the south and west may be but races of this northern form. Mr. Scudder says that "No possible "step in the gradation from one extreme to the other is wanting, and both "extremes are found equally among numerous examples from as widely "distant places as Massachusetts and the Great Slave Lake; although "the suite of specimens with which I have made my comparisons seems "to indicate that the paler forms are more commonly met with in the "more southern localities, and that more heavily marked ones are the "characteristic forms of the north."

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Mr. Scudder, speaking of a white butterfly taken in Eastern Labrador, says that it is very closely allied to, but distinct from *P. oleracea*. In a note following the description of *P. frigida*, he adds: "It would be "exceedingly difficult to distinguish this species except by immediate "comparison with both sexes of *oleracea*; the differences are more easily "seen than described, although the extreme limits of variation of *oleracea* "do by no means permit us to include within its boundaries this com- "paratively persistent form; it is more heavily marked than any specimen "of *oleracea* which I have seen."

The *Pieris* which Mr. Grote has named *Ganoris borealis* is found along two hundred miles of sea-coast on Anticosti; it is quite abundant on the north shore of the Gulf, terminating in a western direction in the neighborhood of Seven Islands. It occurs throughout the north, on the Labrador Islands, into the Straits of Belle Isle, and probably Newfoundland. I am aware that *P. oleracea* occurs at Quebec, and it may extend on both sides of the St. Lawrence opposite the mouth of the River Saguenay; but it is not found below the latter river, towards the Gulf. It seems curious that *Pieris frigida* or *Ganoris borealis* should, like *Papilio brevicauda*, be confined to the north coast and islands of the Gulf of St. Lawrence, and that the caterpillar of the Anticosti *Pieris* is differently marked and the habits of the butterfly contrary from that of *oleracea*. What is the object of the study of eggs and larvæ of insects? Is it not for the purpose of determining the value of species?

The object in claiming primitive source for some of the northern butterflies, arises mainly from the fact that in them we discover permanency in form and color, while their geographical range is limited in accordance with the distribution of their food plants. That species found scattered over defined circuits are generally tending towards the equator. That many of these are but figurative races removed from their original habitat, and have varied through the influence of food and climate.

In this connection I quote an extract from Geographical Distribution of some Genera of Insects, by Francis Walker, F. L. S., Vol. iv, No. 10 of CAN. ENT.: "In studying the fauna of a mountain it is most suitable "to begin with the top, and to trace it downward, where the agencies or "forms of life become successively more numerous and complicated in "their mutual adaptations and limitations, all being as wheels which serve "to regulate the great living mechanism of which they are the parts. In "like manner, in noticing the faunas of the two primary mountains into

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"which the earth is divisible, their summits being the poles and the "equator their common base, it is advisable to begin with the arctic "species or with those which have ascended to the highest latitudes. The "difference in soil, in vegetation and in elevation facilitate or hinder the "migration and settlement of insects, and help to effect the variety of "distribution, which is one of the chief attractions in the aspects of "nature."

MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

This branch was organized November 11th, 1873. The following officers were elected for the ensuing year :—President, W. Couper ; Vice President, M. Kollmar ; Secretary-Treasurer, F. B. Caulfield ; Council—G. J. Bowles, P. Knetzing, C. W. Pearson, W. Hibbins, jr.

The meetings of the Society are held at the residence of the President, No. 67, Bonaventure Street, Montreal, on the first Wednesday evening in each month.

ENTOMOLOGICAL COLLECTING TOUR.

We would call especial attention to a notice of an Entomological collecting tour about to be undertaken by Dr. S. V. Summers, of New Orleans, La., which will be found on the outside page of cover of our magazine. This is one of the most extensive undertakings of the sort we have ever heard of, and is well worthy of the patronage of Entomologists. The number of specimens guaranteed is extremely liberal, and the returns will no doubt well repay those who invest in the proffered shares. We are duly authorized by Dr. Summers to receive monies for shares on his account, so that any of our readers who may prefer negotiating with us will please communicate with our Secretary, Mr. J. H. McMechan.

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TO OUR PATRONS.

At a special meeting of the Council of the Entomological Society of Ontario, held on the 19th of February, 1874, Mr. J. Williams, being about to remove to Montreal, tendered his resignation as Secretary-Treasurer, which was accepted with regret. Mr. J. H. McMechan having kindly consented to undertake the duties of the office, was unanimously elected as his successor. Our friends and correspondents will please bear this change in mind, and address all remittances and business communications to J. H, McMechan, Secretary-Treasurer, London, Ontario.

CORRESPONDENCE.

PIERIS RAPÆ.—About the last of September, 1873, I netted the first Rape Butterfly that I have ever seen in this part of the country—township of Dunn, county of Haldimand. It is a male butterfly, as described fig. 8, vol. 5, No. 3, CANADIAN ENTOMOLOGIST.—F. C. L.

VANESSA G. ALBUM.—I have lately received from the north-west coast of British America a specimen of *Vanessa G. album.* I do not remember hearing of its being found so far from the Atlantic before—W. H. EDWARDS.

BOOK NOTICES.

Illustrations of the Zygaenidæ and Bombycidæ of North America, by R. H. Stretch, San Francisco, California. Parts 8 and 9, with three colored plates.

The Cincinnati Quarterly Journal of Science, Vol. i, No. i, 8vo., pp. 96.

Catalogue of the Phalaenidæ of California, No. 2, by A. S. Packard, jr., M. D., 8vo., pp. 40, with one photograph plate. From the Proceedings of the Boston Soc. Nat. Hist., Vol xvi.

Nature, to February 12, 1874.

Science Gossip, February, 1874.

Newman's Entomologist, February, 1874.

The Zoologist, February, 1874.

Le Naturaliste Canadien, Fevrier, 1874,

The Western Rural, Chicago, to March 7, 1874.

Prairie Farmer to March 7, 1874.

Indiana Farmer to Feb. 28, ,1874.

Canada Farmer, to March 2, 1874.

Maine Farmer to Feb. 14, 1874.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., APRIL, 1874. No. 4

NOTES ON THE LARVA AND PUPA OF SAPERDA MOESTA, LEC.

BY THE EDITOR.

On the 25th of March, 1873, I received from P. E. Bucke, Esq., P. O. Dep't, Ottawa, a bundle of twigs of the Balm of Gilead tree (*Populus balsamifera*), containing larvæ of *moesta*. These larvæ were very thickly set in the branches, in many places not more than an inch or two apart and situated chiefly at the base of the buds, where the presence of an occupant was indicated by a swelling in the branch, surmounted by a dark brown patch of partly decayed bark. The castings and debris of the food were of a light orange color, and were pushed forward, stuffing the swollen part. The whole length of the excavation made by each larva did not usually exceed an inch, and so much of this towards the front was filled with debris, that the clear space left was very little larger than its body.

The body of the larva was nearly cylindrical, tapering a little posteriorly, and about half an inch in length.

Head very small, dark reddish brown in front, with a pale streak down the centre. Color pale behind; jaws black.

Body above deep yellow, with a glossy surface, sprinkled with very minute short yellow hairs, invisible without a lens. Second segment above and below a little deeper in color, and more horny looking than the other segments; interspaces between segments strongly indented. There was a depressed dorsal line not different in color from the rest of the body, but sunken, and on each side of it the projecting rings of the body were somewhat flattened. Spiracles pale brown, rather small. Terminal segment a little more hairy than the others.

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The under surface was similar in color to the upper. I was not able to detect any trace of feet, although a careful examination was made with a lens.

No further observations on these larvae were made until May 2, when I expected to find them in the chrysalis state, but was surprised to find in the several cells I opened that no pupal enclosure was to be seen, but that the head, antennae and legs were fully developed, while the wings and wing cases were only partially so. The wing cases, which covered the membraneous wings, were not more than one-eighth of an inch long, and projected out over the sides, spreading almost free from the body. At their base they were yellowish and semi-transparent, while from about the middle to the base they were black and covered with the usual small granulations. The scutellum was indicated by a short black streak widening anteriorly, while behind this the body was of a dirty yellow color and soft, flabby consistence. This color and consistence prevailed below also, behind the base of the legs, while about and anterior to them the color was black. The insect could move its legs, but was very sluggish and did not seem disposed to move at all unless disturbed; at this stage it was incapable of walking. Several of the chambers, which had been opened with care, were closed and tied up with their occupants in them; these were examined again on the 9th of May, when the abdomen was found to have decreased in size and become uniformly dark, almost black below, with the surface roughened, but still yellow at the tip. Above there was a large black patch behind the scutellum, covering nearly one-third of the body, and another large black spot near the tip, covering the 10th and 11th segments, while the interspace between these two segments was of a dark greenish hue; the elytra had lengthened so far as to cover about two-thirds of the abdomen. The beetle was more active now, and able to walk, although with difficulty.

On the 16th of May the wing cases of one were found of full length, but not fully expanded so as to cover the body, while in another case they were fully developed. The twigs containing these insects had been allowed to remain in a dry room without any means being taken to keep them moist, hence they had become quite dry and brittle. On the 24th of May a fresh bundle of twigs was received from Mr. Bucke, and in these, while the greater number appeared to have been eaten by woodpeckers, some five or six specimens were found in a state of chrysalis one cell was occupied by the pupa of some parasite.

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The chrysalis was nearly half an inch long. Body semi-transparent; color uniform pale yellow, excepting the eyes and enclosed mandibles, which were black; the knee joints were faintly tipped with brown, and a faint brown line down each side of the scutellum. All the parts of the insect were plainly visible through the pupa case. The wings were very small and diverged to each side of the scutellum in a similar manner to that described on the 2nd of May.

On the 29th of May two of these which had been seen as pupae on the 24th, had become perfect beetles; another had its wing cases green, but its abdomen was yellow and soft; two others were still unchanged pupae. Early in June all were perfected, the beetles having escaped from their enclosures by gnawing a neat round hole through the twig, just large enough to allow of the passage of the body.

Possibly the insects I examined on the 2nd of May might have already passed through their pupa stage, and their subsequent slow developement have been due to the altered condition of the twigs containing them, owing to the dry atmosphere in which they were kept.

OBSERVATIONS ON FORMICA FLAVA, AND INFERENCES DEDUCTED THEREFROM.

BY THOMAS G. GENTRY, GERMANTOWN, PA.

During the latter part of the month of May, of the spring of 1873, while reclining upon the ground beneath the shade of a tree growing on the outskirts of a thicket, the sun at the time beaming in all its glory and splendor overhead, my attention was suddenly arrested by the activity and excitement presented by a nest of the ordinary yellow ant, *Formica flava*. Scattered promiscously upon the earth before me were numberless larvae in various stages of developement, and not a few of immobile pupae, brought up from their subterranean domiciles by their ever active and thoughtful nurses to receive the life-sustaining benefits of the sunlight, while here and there were a dozen or more of ants that had but recently escaped from the prison-houses in which they had been confined —frail, to be sure, and with a pallid, death-like appearance, in conse-

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quence of their long imprisonment, basking in the warmth of the sun to dry their bodies and to give color and tone to their systems, preparatory to entering upon the duties of the *formicarium*.

The full-grown neuters were the very pictures of restlessness. Consternation was evidently written upon their looks, if I may be permitted so to speak, and clearly evidenced in their hasty and dubious movements. The ova, larvae and pupae were being carried away to places of security beneath the ground, or hustled away to the neighboring grasses, in short, wherever their nurses could find safe and comfortable quarters for them.

Looking around me to find the cause of all this turmoil, my eyes soon rested upon two or three individuals of *Formica subterranea*, Lat. which had intruded their unbidden presence into this peaceful and hitherto happy family. There is no doubt that these ruthless invaders of this flourishing oasis of ant-life, were bent upon plunder or slaughter.

If pillage was their motive, these giants no doubt soon learned that if their weaker, more distant kin were unable to cope with them in strength, they could assuredly make up for its loss in stratagem, sagacity and numbers.

Not daring to attack their more powerful neighbors, after having sheltered the more tender, and being unable to defend their comrades who had just attained perfection and who were necessarily impotent, or to carry them to places of safety in view of their weight, in order to defeat the plans of the foe they set to work and destroyed those upon which but a few days before they had lavished the most endearing attentions.

While the major part of the workers were engaged in looking after the wants of the immature, and manifesting a readiness to provide for their further safety, should necessity demand it, a few were observed running about seizing in their mandibles the newly developed, not to bear them beyond the reach of danger, as was at first supposed, but to save them a life of servitude mayhap, at any rate to keep them from falling a living prey to the rapacity of the enemy.

Knowing by experience the sympathy and affection which the nurses ever bear towards these frail and tender objects of their care, this act of inhumanity, so to speak, struck me as peculiarly novel and astonishing. Prompted by curiosity to know the nature of the wounds inflicted, I raised a still struggling being up, and having placed it upon the palm of

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my hand, made a careful examination of it by the aid of a small pocket microscope of twenty diameters. On the superior and inferior aspects of the abdomen, between the second and third semites, were observed two deep wounds which met each other in the interior, the mandibles having penetrated completely.

Several instances of the kind occurred. It cannot be assumed that these wounds were purely accidental. It might be possible that accidents of the kind would occur once in a long time through inexperience, but to argue that insects so habituated to such manipulations as the neuters assuredly are, would be likely to make such mistakes, when it is known —especially in the case of larvae, whose integuments and tissues are so delicate and yielding by reason of early age, that the greatest caution is necessary, is, in the estimation of the writer, perfectly préposterous. Admitting, for the sake of argument, an occasional occurrence of the kind, a successive repetition of it could hardly be justified. But on the ground that a purpose is thereby subserved, there is no doubt the object had in view is justified by the means employed for its accomplishment.

What this purpose is the writer will endeavor to show in a few carefully drawn opinions. It is a well established fact, as an abundance of well authenticated instances could be cited by the writer confirmatory thereof, that many animals of many families and orders, both in the domesticated and undomesticated conditions, are wont to destroy their disabled and wounded comrades. In wild animals, in many cases, the destruction seems to be warranted in order to preserve the herd or pack from the close pursuit of enemies. Mr. Charles Darwin, in his work entitled "Origin of Species," if I mistake not the work, remarks that "Instinct or reason may suggest the expelling an injured companion, lest "beasts of prey, including man, should be tempted to follow the troop."

In tame animals, of which some well authenticated examples are recorded in the case of the hog, cow, &c., the habit is undoubtedly one which affords a beautiful and forcible illustration of what is known as the "survival of instincts."

Audubon, in writing of the Wild Turkey (*Meleagris gallopavo*), which is found in great abundance in the far West, observes substantially that the old males in their marches often destroy the young by picking the head, but do not venture to disturb the full-grown and vigorous. The feeble and immature being an encumbrance to the party, it is obvious that their destruction would tend to the latter's preservation. Should

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they be actuated by sympathetic and affectionate emotions, it is evident that the constant watchfulness and attention which the weak would demand, would necessarily retard the rate of their movement, and doubtless lead to the destruction of the entire flock. Here it is plain to the most obtuse intellect that instinct or reason, the latter, as I conceive it to be, operates for individual and family good.

Granting that instinct or reason does sometimes act for individual and family preservation, in the manner described, the writer does not feel at liberty to admit that in every case that may arise in which the weak and disabled are sacrificed, that it is done for the material benefit of the physically able and robust. How the destruction of the weak and newly developed ant can result in good to the colony, it is difficult to conceive in view of the fact that not the slightest effort to escape the danger by continued flight is undertaken, the sole object being to hide the immature away from impending danger, either in the natural galleries or underneath adjoining objects. A vigilant and powerful enemy, under these circumstances, would have very little difficulty in carrying out the very spirit and letter of his programme.

There seems to be one of two theories for the writer's selection wherewith to account for in anything like a satisfactory manner, this strange and abnormal habit upon the part of an insect which has been proverbially distinguished for its kind and affectionate disposition towards the tender beings committed to its trust—either to attribute it to an utter unwillingness and repugnance to witness its *proteges* made the servants of a hostile race, or to the survival and exhibition of a habit which was in vogue far back in the buried ages of the past, when this species of *Formica* was migratory or of a roving disposition.

That a feeling of utter repugnance sometimes takes possession of the nature of some forms of animal existence, when the objects of their solicitude and care are or are about to be reduced to a state of confinement, and impels them to a course of action which bears the semblance of inhumanity, will be patent to all from what follows.

In the summer of 1873 a friend of the writer's having procured a pair of the young of *Turdus migratorius*, Linn., placed them in a cage and hung the latter on a tree, close to his dwelling, where the parent birds could still administer to their temporal well-being. All went well for several days, and the parents, who had busied themselves in the intervals of feeding in their attempts to relieve their offspring, finding all their

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efforts fruitless and ineffectual, flew away, but returned shortly afterwards bearing in their bills objects of a green color, most probably worms of poisonous qualities, fed them to the young and left, never to return. A few minutes afterwards the latter were dead.

It is evident from the above that the parents, finding their efforts of no avail to relieve their young from their imprisoned condition, sought this way of saving them from a life in preference to which death would assuredly prove desirable. Other instances might be cited, but I forbear Enough has been written to sustain the writer's position, that in the case of *Formica flava* an unwillingness to suffer any of the colony to undergo a life of slavery was the controlling motive in the sacrifice alluded to.

If it could be shown in the above cases that any material good was subserved thereby, or that any advantage was acquired, the author would be free to admit that Mr. Darwin's theory to account for the destruction was the only one competent to explain all the known facts. But from the foregoing statements it is evident that a desire to save their offspring and *proteges*, on the part of parents and guardians, from the condition of involuntary servitude, no doubt is equally as important.

ON SOME OF OUR COMMON INSECTS.

14. THE COMMON COCKCHAFER—Lachnosterna quercina, Knoch.

BY GAMBLE GEDDES, LONDON, ONT.

Our readers will recognize at once in figure 8, *(Lachnosterna quercina)* the common May-bug in its different stages. 1 shows the chrysalis; 2 the larva, and 3 and 4 the perfect insect. It appears in some years in vast numbers, and is greatly complained of, whilst in other seasons it is comparatively rare. This depends chiefly on the long duration of its developement. The insect flies with a humming noise, so that one is aware of its approach at the distance of some yards. It appears principally in May and the beginning of June, and feeds upon

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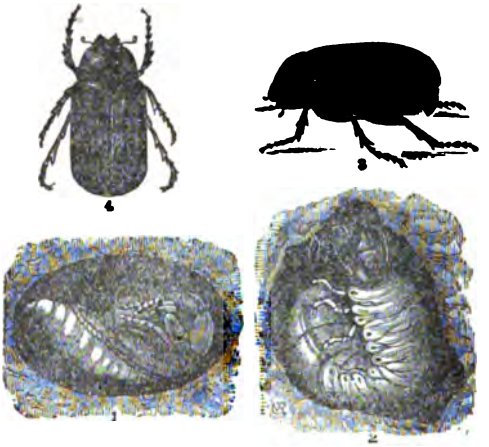
several trees, amongst which may be mentioned particularly the cherry tree, as well as the oak, beech, maple and poplar. It is entirely nocturnal in its habits, and during the day time is sluggish and seeks shelter under boards and logs.

The perfect insect is of a chestnut brown color on the back, with a smooth and shining coat. Underneath it is of a lighter shade of brown.

Fig. 8.



After the pairing of the sexes the male soon dies, and the female burrows into the earth about nine or twelve inches, where she deposits 60 or 70 eggs, after which she comes out and lives but a very short time. These eggs are soon hatched into small white grubs, which commence almost immediately to feed upon the rootlets of plants. As they grow the larvae become great enemies of the agriculturist. When they are hatched they are just in time for the tender vegetation of early summer.

In appearance the larva is of a white color, with a light brown head, and when full grown is about the size of one's little finger. They are constantly turning up when digging and gardening are going on, and crows and other birds will often follow the plow to pick up the white grub, to which they are very partial.

At the end of the third summer the grubs stop feeding and bury themselves deep in the ground, where, in an oval cavity, the change to the chrysalis state is accomplished.

In this condition it remains for a variable period, and then appears the perfect insect, which works its way up by degrees to the surface of the ground.

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In the Report of the Entomological Society for 1872, Mr. Saunders says, in reference to this insect:

"Every one must be familiar with the May-beetle, or May-bug, as it is sometimes called, a buzzing beetle, with a rapid but wild and erratic flight, which comes thumping against the windows of lighted rooms at night, in May and early in June: and when the windows are open it dashes in without a moment's consideration, bumping itself against walls and ceilings, occasionally dropping to the floor, then rising again suddenly, it sometimes lands unexpectedly against one's face or neck, or it may be, on one's head, where its sharp claws get entangled in the hair and its further progress is stayed until a forcible removal takes place. At such times it is quite a terror to those whose nerves are weak.

"Although thousands of these summer's evening tormentors are yearly, yea, nightly trodden to death during their brief season, yet thousands of others rise to supply their places, and sometimes they are reinforced by armies of tens of thousands. Then it is that oftimes serious damage is done to trees, whose foliage they consume, their powerful and horny jaws being admirably adapted for cutting and grinding the leaves. Cherry trees are frequently injured in this way, indeed these beetles are not at all particular as to what they eat; the oak, the Lombardy poplar and many other kinds of trees are just as readily attacked, if in their way."

ON MR. COUPER'S COLLECTIONS OF LEPIDOPTERA MADE ON ANTICOSTI ISLAND IN 1873.

BY AUG. R. GROTE,

Curator of Articulata, Buffalo Soc. of Natural Sciences.

The butterflies collected by Mr. Couper have been already enumerated in the "Bulletin of the Buffalo Society of Natural Sciences." They were: *Vanessa atalanta, Argynnis atlantis, Phyciodes tharos, Glaucopsyche Couperi, Cyaniris lucia, Ganoris oleracea* var. *borealis, Papilio brevicauda* and *Cyclopides mandan.* The moths, as far as the Geometridæ, have been determined by me and were as follows:

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Alypia Langtoni, Couper.

Fourteen ♂ and two ♀ specimens received. The males are eight-spotted, the females six-spotted. The male is correctly described by Mr. Couper in the *Can. Nat.* It is only with difficulty that it can be separated from the male *A. octomaculata.* It appears to differ by the parallelism of the inferior edge of the basal sulphur spot on the fore wings with the margin of the wing; in *octomaculata* this spot is oblique. Neither the vine nor Ampelopsis grow on Anticosti, and Mr. Couper states that he has observed *A. Langtonii* ovipositing on the stems of grasses. I have formerly determined a specimen of *A. Langtonii* ♂, from Anticosti, sent me by Mr. Strecker, with other species of the genus, as *A. 8-maculata.*

Haemorrhagia uniformis, (G. & R.)
Hyles chamaenerii, (Harris.)
Lethia gordius, (Cramer.)
Trochilium, sp.

Ten specimens of a species that I do not venture to describe on account of the number of unidentified descriptions extant in the group.

Platarctia parthenos, (Harris.)

As early as 1864, I drew attention to the probability of Mr. Moeschler's *Arctiâ borealis* being identical with the present species, as also to the fact that Mr. Moeschler's papers on the Lepidoptera of Labrador had been written without reference to Kirby or the writings of American Entomologists. It is unfortunate for Mr. Moeschler that Mr. Strecker, whose acquaintance with entomological literature is so slight, should have been selected to make an unnecessary correction. Until Dr. Packard's later separation of the two species is properly contradicted, I do not understand why they should not be separately cited in a catalogue. Mr. Couper collected a single female specimen in fine condition, which seems only to differ from Mr. Moeschler's figure by the collar not being all red as Mr. M. paints it, aside from the sexual characters and the greater size. But Mr. Moeschler's description accords perfectly with my specimen where his figure contradicts it. So far as I can see, my specimen in no way essentially contradicts Harris' original description and figure in Agassiz's "Lake Superior." It is evident, however, that Dr. Packard separates an allied species from *P. parthenos*, as the *borealis* of Moeschler. Without having seen the material upon which Dr. Packard's two descriptions are based, it is useless for me to express any further opinion.

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Arctia virguncula, (Kirby.)

A specimen in fine condition. Except that the figures are smaller, Mr. Moeschler's representation of *speciosa* does not seem to me to differ. I again repeat, provoked by Mr. Strecker's ill-advised remarks, that I called the attention of American Entomologists to this fact in 1864, and it seems to me that to be now charged with an ignorance of Mr. Moeschler's errors, when they were published by me ten years ago, is very absurd and shows merely that Mr. Strecker's knowledge of American Entomological works is not greater than that of Mr. H. B. Moeschler.

Phragmatobia rubricosa, (Harris.)
Habrosyne scripta, (Gosse.)
Thyatira pudens, Guenee.

The single specimen is rubbed and appears to have the spots on the forewings more greyish than usual. It expands 48 m. m.

Agrotis gilvipennis, Grote.

As yet the only described species of the genus from America with yellow hind wings. Specimens sent to Prof. Zeller for examination were kindly determined by him as allied to the Siberian *A. chardinyi.*

Agrotis conflua, (Tr.)

I am indebted to the kindness of Mr. Geo. Norman for some fragments of Scotch specimens of this species, and although my comparisons are not as absolute as I could wish, I feel little doubt that the twenty-four specimens collected by Mr. Couper belong to this species, which is apparently not well known on the Continent. Two Swiss specimens in the collection of the Buffalo Society offer but unimportant differences, while the species seems to vary in the intensity of the color and distinctness of the markings. I have described this species and the preceding in the Report of the Peabody Academy, and I am under obligation to Mr. Geo. Norman for his assistance in this very interesting determination. According to Dr. Staudinger, the species occurs in Iceland, where it is subject to great variation in color.

Eurois occulta, Hubner.

The American specimens are generally more blackish than those from the Continent of Europe, but seem to agree with the form taken in Scotland and the north of England. Mr. Lintner's Albany specimen was more purplish and stouter, and like German specimens in the collection before me.

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Hyppa xylinoides, Guenee.

One specimen.

Nephelodes violans, Guenee.

One specimen.

Heliophila commoides, (Guenee).

The three specimens are less reddish on the primaries than my material from the Middle States, with the dotted t. p. very distinct, but do not seem to differ specifically.

Pyrophila pyramidoides, (Guenee).

One specimen.

Plusia 8-signata, Sanborn.

One specimen.

Plusia simplex, Guenee.

Several specimens.

Plusia bimaculata, Stephens.

This is Guenee's *P. u-brevis;* Mr. Couper's material is in fine condition.

Plusia mappa, G. & R.

One specimen.

Cucullia intermedia, Speyer?

One specimen, much rubbed.

Tarache erastrioides, (Guenee).

Drasteria erichto, Guenee.

Two specimens.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

Continued from Page 52, vol. vi.

CHYSOPELEIA, *gen. nov.*

This genus, though closely allied to *Stilbosis*, *Walshia*, *Elachista*, &c., differs from them somewhat as to the palpi, and yet more as to the neuration of the wings. In the neuration it is near *Stilbosis*, but in many respects is nearer *Walshia*.

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Anterior wings lanceolate, caudate. The costa attains the margin about the middle; discal cell long, narrow, and closed by a slightly oblique discal vein; the costal vein is furcate just before the apex, delivering one of the branches above and one below it; it also sends another branch to the costal margin from behind the cell, one at the end of the cell, and two before it; the discal vein sends a vein to the hinder margin from a point near the median, which passes straight to the hind margin, and just before the discal vein sends a branch to the hind margin also; the submedian is furcate at the base.

Posterior wings linear lanceolate. Costal vein obsolete; the subcostal proceeds straight to the apex, sending a single branch to the *hind* margin just before the apex; the median is slightly sigmoid, attaining the hind margin at about the apical one-fourth, and delivering to it three other branches, the first about the middle. Submedian short.

Wings convoluted in repose, with tufts of raised scales on the anterior ones, *and the tips bent under*. Head and face smooth, with appressed scales; vertex broader than long; face much receding and very narrow; eyes small; antennæ sub-pectinate, a little more than half as long as the wings; palpi drooping, of moderate size; no visible maxillary palpi; tongue rather short, scaled; terminal joint of labial palpi acute, and about two-thirds as long as the second, which is a little enlarged at its apex.

It is not a typical *Laruna*, and yet, possibly, ought not to be separated from it. But I place *Stilbosis*, Clem., as my precedent,

C. purpuriella. N. sp.

Very dark purplish blue, almost black, with an indistinct confused oblique yellowish fascia about the apical fourth. The tufts are black or very dark brown; one is placed within the dorsal margin, at about the basal one-fourth, opposite the space between two others placed opposite to each other, about the middle, and a fourth at about the apical fourth of the wing, also opposite the space between the second and third. The tufts are arranged thus: - ⁝ - *Alar ex.*, ¼ inch. Kentucky. Larva unknown.

AEAEA, *gen. nov.*

Allied to *Chrysopelia*, *Stilbosis*, &c.

Primaries lanceolate, tufted; discal cell narrow and rather acutely closed; the costal vein is short and close to the margin; the subcostal gives off three branches beyond the middle, and a fourth one from the

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end of the cell, and has a common origin with the apical branch, which is bifid close to the apex. The median divides into three branches from the apical part of the cell (the submedian is furcate at the base ?)

Secondaries very narrowly lanceolate. The costal attains the margin about the basal fourth, and from thence to the tip the margin is excised; the subcostal is almost obsolete towards the base and passes straight to the tip; discal cell unclosed; the median divides into three ? branches (or into two ? with an independent discal branch arising so close to them that I have not been able to determine certainly whether it is connected with them or not).

Head smooth with appressed scales; vertex wider than long; antennæ simple, scarcely more than half so long as the wings, with a somewhat elongate basal joint. No visible maxillary palpi; labial palpi long and slender, over-arching the vertex; terminal joint about two-thirds as long as the second. Tongue moderate, densely scaled towards the base.

A. ostryæella. N. sp.

Face, palpi, legs and under surface of the body pale or hoary gray with a faint bluish tinge. Vertex, antennae, thorax and primaries dark steel gray, with a blue or purplish tinge. The basal portion of the dorsal margin of the primaries pale gray, with many of the scales tipped with hoary; behind this lighter portion of the dorsal margin is a rather large raised tuft of blackish or bluish brown scales. An oblique pale gray or whitish fascia crosses about the middle of the wing, being widest and farthest from the base on the dorsal margin, and being margined behind by two small dark tufts of raised scales. About the apical third of the wing is a second fascia of the same hue with the first, and parallel to it, with a small dark tuft of raised scales on its anterior margin and two others on its posterior margin, and in the apical part of the wing, on the dorsal and costal margins and at the apex, three or four other minute tufts of the same hue. The apical part of the wing and ciliae are sprinkled with hoary or snow-white, many of the scales being tipped with that color. *Al. ex.* scarcely ¼ inch. Kentucky.

The larva mines the leaves of the Ironwood *(Ostrya virginica).* I have occasionally, though very rarely, found a single specimen of the mine in June and July, but in August, September and October nearly every leaf upon the trees will have its mine, and many leaves will contain several. The larva is yellowish white, with the mouth ferruginous, and

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two small brownish spots on top of each of the next three segments after the head, and is nearly cylindrical. It is exceedingly difficult to rear the imago, mainly, I think, because the *Ostrya* leaves dry up so quickly, and the larva will seldom make a new mine after leaving an old one, though I have sometimes known it to do so. It leaves the mine to pupate in a small whitish ovoid cocoon among the leaves on the ground. The mine is a singular one. In the natural way it begins at the junction of a vein and the midrib, and extends along the midrib to the next vein; there the parenchyma is taken out between the two veins and with the frass a little tube is constructed along the midrib, and from the mouth of the tube to the edge of the leaf two walls of frass are constructed, between which the larva, when disturbed, retreats into its tube. In the breeding cage, when the leaves are bent or the larva is crowded, it will sometimes vary the form of its mine, or even form a new one, but I doubt if in a state of nature it ever passes beyond the midrib or the two veins. From probably three hundred mines which I have gathered, I have not succeeded in raising half a dozen insects, and Dr. Clemens does not seem to have met with better success, for he does not seem to have been acquainted with the imago, though he mentions the mine and larva in his letter to Mr. Stainton of Oct. 10th, 1859, which is published with an excellent figure of the mined leaf in Mr. Stainton's edition of the Clemens Papers, page 27.

THEISOA, *gen. nov.*

Maxillary palpi microscopic; labial palpi ascending above the vertex (a little longer than in *Elachista*). Antennae simple, more than half as long as the wings. Head and face smooth.

Primaries lanceolate ovate; the costal attains the margin just before the middle. Discal cell very narrow, and closed by a very short discal nervule; the subcostal sends a branch to the margin from before the middle, another from near the end of the cell, and then is deflexed to meet the discal vein, beyond which it sends another branch to the costal margin and there becomes furcate before the tip, delivering a short branch to each margin near the tip. The discal vein is short, straight, a little oblique, and without branches. The median vein gives off to the dorsal margin a single branch beyond the middle, and becomes furcate just beyond the end of the cell. The submedian is furcate at the base.

Posterior wings linear lanceolate. The costa slightly excised from the middle to the tip; the costal vein is near the margin, which it attains at

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the excision; the subcostal passes nearly straight to the apex, its basal half being obsolete; it gives off no branches. Cell unclosed; the median sends a branch to the dorsal margin about the basal fourth, and becomes furcate about the apical third. Wings horizontal in repose.

Ciliae of both wings moderately long. The neuration of the primaries is very nearly the same with that of the next described genus, *Philonome*, but is still nearer to *Elachista*, from which, however, this species differs in having the wings horizontal in repose, and the antennae longer and more pointed.

T. bifasciella. N. sp.

Palpi silvery white; face white, tinged with golden yellow, which deepens towards the vertex, where it becomes pale ochreous; antennae with alternate annulations of white and dark brown; thorax and basal third of the primaries pale saffron, slightly suffused with fuscous; at the basal third of the primaries is a silvery white fascia dark margined internally, and thence to the tip the wing is pale saffron yellow, suffused with fuscous and white and becoming darker towards the apex; at the apical third is a second white fascia, which is frequently very indistinct or even obsolete, except upon the costa, where it is oblique, distinct and strongly dark margined internally, or rather with a dusky spot on the costa before it. Ciliae dusky yellowish. *Al. ex.* nearly ⅓ inch. Kentucky in May. Larva unknown.

ELACHISTA.

E. praematurella? Clem.

This species belongs to the sub-group containing *E. nigrella* of Europe. Possibly it may prove to be one of the European species. I am not absolutely certain that my captured specimens belong to *praematurella*, as I have not seen any of Dr. Clemens' specimens, and do not, indeed, know that there are any extant. I do not know its food plant, though from the frequency with which I have found its corpse-like pupa on fallen leaves in "blue grass" pastures, I suspect that it mines that species *(Poa pratensis)*, and this suspicion is strengthened by the fact that other species of the same group mine plants of the same genus in Europe. Dr. Clemens was not acquainted with the food plant of *praematurella*. In my specimens the costal and dorsal spots are opposite as Dr. Clemens describes *praematurella*, but the fascia is a little oblique,

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being a little nearer to the base on the costal than on the dorsal margin, and the wing before the fascia has a grayish hue, occasioned by minute white dusting, and Dr. Clemens does not mention these particulars in *praematurella;* but a more decided difference is that in *praematurella* the fascia is " just behind the middle," whilst in this species it is just before it. My specimens are near *E. gregsoni*, as figured by Mr. Stainton, but have less white at the apex. But the species of this group are very difficult to distinguish without comparison of bred specimens, and I have not thought it necessary to separate my specimens from *praematurella.* It is the only true *Elachista* that I have thus far met with here, though some of the immediately preceding genera approach this genus closely. Like *praematurella*, my specimens appear early in April.

BOOKS RECEIVED.

The first number of " The Cincinnatti Quarterly Journal of Science," published in January, came to hand in due season. It is a well got up octavo serial of 96 pages; editor and proprietor, S. A. Miller, Cincinnatti, Ohio; price, three dollars per year. Among the more interesting original papers contained in this number we notice one by our esteemed friend and contributor, V. T. Chambers, of Covington, Ky., on Fresh Water Entomostraca, and among the selected articles, " Facts in the Physiology of Spiders and Insects," and " Movements of Insects on Dry, Polished and Vertical Surfaces," both by John Blackwell, from the Jour. and Pro. of the Linnean Society. In addition to these there are a number of interesting original and selected papers on Geology, Botany, Zoology, &c. We sincerely wish this new journal success.

Illustrations of the Zygænidæ and Bombycidæ of North America, by Richard H. Stretch, San Francisco, vol. 1, parts 8 and 9. These two parts issued together complete the first volume of Mr. Stretch's excellent work on the Zygænidæ and Bombycidæ. These latter parts contain three colored plates, two of moths, illustrating 29 species, and one of larvae, containing 11 species. The whole volume consists of 242 pages octavo of letter-press, with ten well finished colored plates, on each of which a number of species are faithfully delineated. In this work—in addition to

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the author's own material—are brought together a large number of facts and details hitherto scattered throughout the various scientific journals and publications, relating to the members of this interesting family. We hope Mr. Stretch will receive such encouragement from Entomologists as will reward him for his valued labors in this department, and stimulate him to further efforts.

Catalogue of the Phalaenidæ of California, No. 2, by A. S. Packard, jr., M. D. This is an octavo pamphlet of 40 pages, with one photograph plate, illustrating 24 new species, detailed descriptions of which are given in the accompanying letter-press, together with many other interesting facts relating to other Californian species.

EDITORIAL SUMMARY.

MR. RILEY RECEIVES A HANDSOME TESTIMONIAL.

The following correspondence explains itself:

AGENCE CONSULAIRE DE FRANCE A ST. LOUIS,
ST. LOUIS, MO., FEB. 23, 1874.

Prof. Chas. V. Riley, State Entomologist, St. Louis, Mo.:

DEAR SIR.—I have the honor to inform you that his excellency, the Minister of Foreign Affairs, has forwarded to me through the Consulate of New Orleans, the gold medal awarded to you by the Minister of Agriculture and Commerce, of France, in appreciation of discoveries in economic entomology, and especially of services rendered to French grape culture.

I congratulate you sincerely on this well deserved compliment. It is a proof that your talents and labors have been recognized by very high and competent judges.

Accept my assurance of the high regard with which I am, yours respectfully,

EMILE KARST,
Agent Consulaire de France.

The medal is of gold, very heavy and handsomely finished. It is round, probabiy an inch and a half in diameter, and bears upon its face the head of the Goddess of Liberty, in bas-relief, with the words: "Republique Francaise." Upon the reverse is:

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"Mr. Riley, a St. Louis, Missouri, Services Rendus a La Viticulture Francaise, 1873," encircled by "Ministere de l'Agriculture et du Commerce."

The following is Mr. Riley's acknowledgement:

ST. LOUIS, FEB. 23, 1874.

Emile Karst, Agent Consulaire de France:

MY DEAR SIR.—Your favor of to-day is at hand. Knowledge, to the seeker after it, brings with it a reward far higher and more lasting than any outward token. Yet am I gratified to receive this testimonial of appreciation from the French Republic; because it shows that, while endeavoring. as a servant of the State of Missouri, to do what lies in my power for the advancement of agriculture within her borders, my efforts have been appreciated elsewhere. It illustrates that science—the true interpretation of nature's workings, and mighty lever to civilization and progress—is not local, but sheds her bright beams among all nations. It proves that the discovery of any fact tending to promote the comforts and conveniences of human existence, or, as Bacon so tersely expresses it, *humanis commodis inservire*, belongs not to one State alone, but to the world.

Yours respectfully,

C. V. RILEY, State Entomologist.

THE PHYLLOXERA.

The following article from the Bulletin des Sceances de la Society d'Agriculture de France, 1872, p. 514, may be of interest to some of our vine-growers as showing the good effect of an application of soot for the destruction of the grape-vine root gall-louse. However, not having tried the soot ourselves, we can only give the experience of others, and add that Dr. Erni, formerly chemist to the Department of Agriculture, in a letter from Berne, Switzerland, has also highly recommended the use of soot for the same insect.

"M. Rogier, mayor of Poule Gard, exhibited to the central society of agriculture the results obtained by the use of soot in the treatment of vines attacked by the *phylloxera*. A young vine attacked by this insect in 1869, was treated with soot put at the foot or root of each stem, in the quantity of a half kilogram, (about one and one-tenth of a pound.) The vine recovered. The following years all the stems which composed it were smoked with soot. This vine has a remarkable vigor, while the neighboring vines were dead or seriously injured. All vines treated with

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soot, used as a preservative compost, are healthier, although surrounded with diseased vines."

We give the above extract for what it is worth, and hope some of our correspondents will try soot and report the result to the Department, as we have scarcely any of these destructive insects in our own immediate neighborhood. In reference to this insect, the grape-root gall-louse, the Department has received a very interesting letter from Mr. George W. Campbell, of Delaware, Ohio, in which he expresses his opinion that the aphis *(pemphigus)* affecting the leaves and that upon the roots are not identical. He says:

"I have since then found in two instances what were doubtless eggs of the *phylloxera* (root-gall-louse) upon diseased roots the same as those within the galls, but solitary, and not in clusters as in the galls. This, I think, settles the question that the aphides infesting the roots are propagated under ground, upon the roots, and that they are probably not the same as are propagated in the galls upon the leaves."

Mr. Campbell also sent specimens of the roots injured, together with numerous root gall-lice clustered upon them, but although carefully examined with the microscope, we failed to find any eggs whatever upon the roots sent. These roots, however, have been planted just as received, with the insects upon them, in a flower-pot, and placed in a large wardian case in close contact with other pots containing healthy vines, in order to find out if the insects will pass from one vine to another during the winter, and if the healthy roots will next season be infested with either root or leaf gall-lice. We give Mr. Campbell's remarks merely to stimulate further inquiry into the identity of the two insects, as many naturalists have stated them to be merely varieties of the same insect. In France, it appears that flooding the vineyards at certain seasons to drown the insect out has been recommended, but this plan, even if successful, could only be carried out in level places, and could not be adopted in side-hill vineyards.—*Monthly Report of the Department of Agriculture.*

CORRECTION.—We would draw attention to an error which appeared in Dr. Summers' advertisement last month, and which will be found corrected in the present issue. It is in reference to the time up to which shares may be secured of the material to be collected in the lengthened tour he is about to undertake. It should be up to *December*, 1874, instead of April; after that date specimens only will be for sale; we have a few yet to dispose of,—parties desiring them will please address our Secretary.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., MAY, 1874. No. 5

ON SOME OF OUR COMMON INSECTS.

15.—THE COCCINELLIDÆ.

BY R. V. ROGERS, KINGSTON.

"Of all the painted populace that live in fields and live ambrosial lives," there is scarcely a family better known than those which compose the last of all the tribes of Hard-shells, the Coccinellidæ. To the young and to the old, to the illiterate and to the scientist, they are equally familiar and equally interesting. Popular sympathy is extended towards them by the elders because they do much good in preventing the excessive multiplication of Aphides; by the juveniles because they are very pretty little things and tamely pitter-patter to and fro, and their supposed misfortunes affect deeply sensitive little hearts, while infantile accents lisp "Lady-bird, lady-bird, fly away home; your house is on fire, your children are burned." They are distinguishable chiefly by the colors of and the spots upon their wing covers; the different species are sometimes difficult to discriminate; they number upwards of one thousand, and more than thirty species are known to inhabit Canada.

The general colors of the Coccinellidæ are yellow, red or orange, with black spots, and black with red, white or yellow spots, the spots being either lunate or round. Their shape is hemispherical, and although of variable size, an average specimen "bears a considerable resemblance in size and figure to an ordinary split pea; they have but very short legs and therefore creep but slowly; their powers of flight, however, are considerable." When alarmed or laid hold of, they fold up their tiny limbs and eject from the joints a yellow, mucilaginous fluid, which has a somewhat strong and disagreeable odor. This fluid entitles the pretty Lady-birds to be ranked among the *materia medica*, and to be assigned a place in the Phamacopœia, for it is a superior, cheap and never-failing

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remedy of that most harrowing of pains, the tooth-ache. The learned President of the Entomological Society of Ontario says that he has never possessed sufficient courage to test its qualities himself, but a well-known American brother of the net and bottle tells us that he tried this application in two instances, and the tooth-ache was immediately relieved; but he confesses that he was uncertain whether the remedy or the faith of the patient acted therapeutically, or the tooth ceased troubling of itself. Let us be charitable and give the benefit of the doubt to the pretty little beetle.

The Germans call these insects *Marien-kaefer*, Lady beetles of the Virgin Mary; while in France they have the equally fine names of *Vaches de Deice*, or *Betes de la Vierge*, Cows of the Lord or animals of the Virgin. And they have good claims to be held in such esteem, for they are most beneficial to man in destroying the plant-lice, which, if allowed to go on propagating and increasing unchecked, would soon reduce the most fertile country into a barren and a howling wilderness. Lady-birds both in their perfect and in their larval state, feed on these lice, and, providentially, few trees, plants or shrubs infested by these disgusting and destructive creatures are to be found whereon is not also this antidote for them. The grubs, which are of a flattened shape and darkish color, spotted usually with red or yellow, and furnished with six short legs near the fore part of the body, are far more voracious than the mature insect; they creep along on the leaves of plants until they find the helpless Aphides, among which they ravage and riot like wolves in a sheep-cot, and then, doubtless, many a heart-broken Aphis parent, pointing to the aldermanic proportions of the lady, exclaim: "Foul murder hath been done; lo! here's the proof!"

Occasionally Lady-birds occur in immense swarms. Kirby and Spence relate that on one occasion the banks of the Humber were so thickly strewn with the common species, that it was difficult to walk without treading upon them; at another time they covered in great numbers the sand-hills of Norfolk, and again, the cliffs of Kent and Sussex, "to the no small alarm of the superstitious, who thought them the forerunners of some direful evil."

The eggs of these little creatures are long and oval, of a yellowish color and deposited in patches, oftimes among a colony of plant-lice, so that, thanks to the wondrous instinct of the mother, the larvae have not far to crawl to get their first hearty meal.

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The larvae consume immense quantities of Aphides, and may be seen chasing, or rather, stalking the plant-lice, and eating them one after the other, taking the whole set on a leaf or stem in regular order. "The larvæ (see fig. 9) are rather long, oval, soft-bodied and pointed behind, with the prothorax larger than the other rings, often gaily colored and beset with tubercles or spines." After having eaten voraciously for the appointed time, the larva attaches itself by its tail to a leaf or a twig—after the fashion of a caterpillar—and either throws back its skin or else keeps it loosely folded about it as a protection; in this position it remains quiescent for some ten or fifteen days, and then emerges a perfect insect.

Fig. 9.

We will now briefly refer to some of the well known Coccinellidae which make the Dominion of Canada their home.

The Two-spotted Coccinella, *C. bipunctata*, Linn., is our most common species. They appear to have two broods each season; the eggs are of an orange yellow, and attached in bunches of about twenty-five to the bark of trees. They hatch out when the leaves and their natural article of diet, the Aphis, appear. The body of the larva is black, with flattened tubercles, adorned on top with spines; on each side of the first abdominal segment is a yellowish spot, and there is another broad one in the middle of the fourth segment, and one on each side. Packard thus describes the *modus operandi* of the larva becoming a pupa, and the appearance of the pupa itself: "The larva begins the operation by attaching very firmly, with a sort of silky gum, its tail to the leaf, the point of attachment not being the extreme tip, but just before it, where the tip of the abdomen of the pupa is situated. Meanwhile the body contracts in length and widens, the head is bent upon the breast, and in about 24 hours the skin splits open and discloses the pupa. The body of the pupa is black; the head is also black, and the prothorax is black and yellowish pink, with a black dot on each side, and a smaller black dot on each edge. The meso-thorax, wing-covers, scutellum and legs are shining black. The abdominal rings are pale flesh-colored, with two rows of large black spots on each side, the spots being transverse; the terga of the fourth to the seventh segments are separated, the body being arched and leaving a deep furrow between."

Fig. 10.

The Nine-spotted Coccinella, *C. novem-notata*, Herbst. (see fig. 10), is one of our most common beetles, and may be found in all parts of our Dominion; it is of a red brick color, somewhat

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larger than the Two-spotted, and ornamented with nine black spots.

The Plain Lady-bird, *C. munda*, Say. (see fig. 11), is rather smaller than the others of its kind, of a light brick red, but with its elytra unadorned with any spots.

Fig. 11.

The Three-banded Coccinella, *C. trifasciata*, Linn, is of a red brick color, marked with two irregular black bands across the elytra, and a black spot near the posterior angle. It is of an intermediate size between its cousins, the Two-spotted Lady-bird and the Fifteen-spotted Mysia.

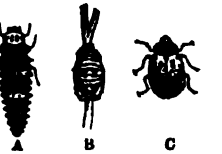
The Spotted Lady-bird, *Hippodamia maculata*, De Geer (see fig. 12) is a small pinkish beetle, but occasionally of a pale red, with large black blotches twelve in number; two of them on one elytron are opposite to and touch two on the other. Mr. Riley says that this insect commits great havoc upon the Chinch Bug, and upon the eggs of the Colorado Potato Beetle.

Fig. 12.

The Thirteen-dotted Lady-bird, *H. 13-punctata*, Linn. (see fig. 13) is rather larger than the preceding: it has thirteen black spots on a brick red ground.

Fig. 13.

Fig. 14.



A B C

The Convergent Lady-bird, *H. convergens*, Guer. (see fig. 14) is of a deep orange red color, marked with black and white. It has been of great use in checking the ravages of that destructive pest, the Colorado Bug; its larva is blue, orange and black, and in its pupa state it is of the exact color of the larvae of the Colorado Beetle, for which it is often, doubtless, mistaken and ruthlessly destroyed.

The Parenthetical Lady-bird, *H. parenthesis*, Say, is a small beetle of a dull red color, and can be easily distinguished at a glance by the dark marks, curved like the bands of a parenthesis ( ), one on the hinder part of either wing cover; there are two black spots on each elytra, besides the parenthesis, one on the anterior part and the other on the inner margin, touching the one on the other cover.

The Fifteen-spotted Mysia, *Mysia 15-punctata*, Oliv., is black on the head and prothorax, with seven black spots on each of the brownish red elytra, and another on the scutellum, according to Packard. But it appears to vary much in its perfect form and in color from a very light

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grey to a deep chestnut brown. The larva, which is about half an inch in length, black on the upper surface, with a pale spot on the under edge of the prothoracic ring, and furnished with six rows of stout spinulated spines, is an inveterate foe to the larvae of the Colorado Beetle, and on page 169 of the third volume of the ENTOMOLOGIST we have a most graphic account of the summary way in which the young lady despatches the grub.

The *Chilocorus bivulnerus*, Mulsant (see fig. 15) is an obese little thing, with minute legs, of a black color, and beautified with two yellow spots.

Fig. 15.

Such are a few of the very many Lady-birds that creep among our trees and adorn our Entomological cabinets.

REMARKABLE VARIATIONS IN COLORATION, ORNAMENTATION, &c., OF CERTAIN CREPUSCULAR AND NOCTURNAL LEPIDOPTEROUS LARVÆ.

BY THOMAS G. GENTRY, GERMANTOWN, PA.

Having spent considerable time during the past season in the collection and study of various larval forms of our twilight and night-fliers, I was peculiarly impressed with the novel colors, markings, and external structural characters presented by those that were taken late in the autumn, at the period when the leaves were donning their autumnal hues. To one who has rendered himself familiar with their usual outward characters, a moment's inspection was sufficient to show a marked contrast between those taken early in the season, when the leaves were fresh and green, and those captured later, when the foliage of the trees had sustained a check to their vitality. That these larval changes have a producing cause it shall be my aim to show in the conclusion of the present article.

Of the many specimens taken by the writer during the past season, and they were confined to but a few species of as many genera, none exhibited these variations more clearly and prominently than *Telea poly-*

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phemus (Attacus polyphemus of Fabricius), *Actias luna*, Linn. *(Attacus luna* of Fabricius), *Eacles imperialis* of Hubner, and the *Sphinx quinquemaculata* of authors. Before entering into a description of the anomalous forms, the writer deems it not amiss to detail the leading characters of the normal ones after their last skin moulting, and just prior to their assumption of the chrysalis condition.

Actias luna, Linn.

Attacus luna, Fabr. (normal.)

Des.—Length of caterpillar, three inches. General color, pale bluish green. Head nearly elliptical, somewhat pearl colored. Oral appendages similarly colored. A pale yellow stripe extending along each side, just below the line of spiracles, from the first to the tenth segment; narrow transverse bands of a similar color between the rings, continued from side to side, crossing the dorsum. On each ring there are six pearl-colored warts, tinged with purple, and at the posterior part of the abdomen three brown spots, edged above with yellow. Specimens captured in August whilst feeding upon the Black Walnut *(Juglans nigra.)*

Variety of same.

Des.—Length, two and three-eighth inches. General color, reddish brown inclining to dullness. Head and oral appendages similar. The lateral and transverse stripes wanting, passing, no doubt, through the various shades of yellow, orange, red, into the general color of the body. Posterior brown abdominal spots present, but lacking the yellow edging and shining very conspicuously from the depth of their color. The six pearl-colored warts, with their purple tinge, have assumed a richer hue, blazing like a coronet of rubies. Taken in October, early part, while feeding upon *Juglans nigra.* Cocoons of a beautiful reddish brown. Number of specimens taken, six.

Telea polyphemus (normal).

Des.—Length, three inches. General color, golden green. Head light brown, nearly elliptical; mouth pieces similarly colored. A transverse, conspicuously-colored yellow band on the posterior margin of the pro-thoracic segment. Six rows of gold-colored warts, two dorsal, two lateral, and two sub-lateral, reaching from the meso-thoracic to the eighth abdominal ring; each wart tipped with two moderately long blackish hairs. Between the rings, from the fourth to the tenth segment, a trans-

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verse yellow band. Spiracles transversely oval, with brown centres, encircled with yellow. Taken during the latter part of August, while feeding upon *Acer rubrum.*

Variety of same.

Des.—Length 2¾ inches. General color green, with a stronger and richer tinge of yellow. Head and oral appendages a deeper shade of brown than the preceding. The warts of the color of red sealing wax along the back, but upon the lateral walls somewhat elongate oval in shape, of an orange color in the middle, deep red above and below, and with a narrow vein of the latter color encircling the whole. Spiracles transversely oval, red in the centre, and surrounded by an orange-colored border. Taken during the second week of October while feeding upon the leaves of *Acer rubrum.* Number of specimens captured, twelve. These caterpillars have a very close resemblance in markings to the normal form of the larva of *A. luna.*

Eacles imperialis, Hubner (normal).

Des.—Length, four inches. General color, varying from a dark to a light green. Head nearly elliptical, dark brown. Oral appendages similar in color. Six rows of spiniferous tubercles, two dorsal, two lateral, and two sub-lateral, extending from the first to the last segment. The meso and meta-thoracic spines moderately long and slightly curved; spiracles oval, with dark centres and yellowish margins. The entire larva invested with a dense growth of long gray hairs. Taken during the last week of August, and the early part of September. This species has been observed to feed upon *Juniperus Virginianus, J. communis, Acer rubrum* and the various species of *Pinus.* I might add here that for the past four years, in the neighborhood of Germantown, it seems to have deserted in a great measure Coniferous plants, and to have taken to *Acer rubrum.* Where I find one upon cone-bearing plants, I discover twenty upon the Red Maple.

Several varieties of the *imperialis* of Drury have been observed as late as the 12th of October, exhibiting marked contrasts from the normal form, and varying slightly from each other in the details of color and marking.

Variety A.

Des.—Length, two and three-fourth inches. General color, reddish brown. Head and oral appendages similarly colored. Spines small in

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proportion to size. Entire body slightly invested with short scattered hairs. Two specimens only taken, while feeding upon *Acer rubrum*.

Variety B.

Des.—Length, two and a half inches. General color dark brown, exhibiting in certain parts a decided shade of black. In other particulars identical with Variety A. Found at the base of a pine tree. Most likely had been dislodged therefrom. It had evidently not attained its full size, since it continued to feed for nearly a week afterwards. No apparent change was observed in its color from the above, at the time of entering the ground.

Variety C.

Des.—Length, nearly three inches. General color light yellowish brown, with a dark median dorsal band an eighth of an inch long, extending from the posterior margin of the pro-thoracic to the beginning of the anal segments; a much wider one above the line of spiracles, and a similar one above that of the pro-legs. These longitudinal bands were crossed between the rings by transverse ones, similar in color. Spiracles with dark centres and yellowish rims. Entire larva presented a perfectly smooth surface, affording a striking contrast to that of the normal type. Taken upon *Acer rubrum*. Six specimens captured.

Sphinx 5-maculata (normal).

Des.—Length, three inches. General color, green. Head and oral appendages dark, inclining to black. Lateral, oblique, beaded bands of a light color, seven in number, each band passing obliquely through two segments, from the first abdominal to the anal inclusive. Spiracles nearly circular, with dark centres, surrounded by light annuli. Caudal appendage nearly black, somewhat armed with rudimentary spines. Taken in the early part of September, while feeding upon the different varieties of our ordinary white potato, *Solanum tuberosum*, L., the common Jamestown Weed, *Datura stramonium*, L., and the cultivated tobacco, *Nicotiana tabacum*, L.

Variety of same.

Des.—Length, varying from two and a half to two and three-fourth inches. General color dark, bordering on black, rivalling that of the head of the normal form. Lateral oblique bands similarly colored with

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the body, their outline being indicated by the prominence due to their beaded structure. Spiracles dark, with no trace of light annuli. Observed during the middle of October, in the vicinity of Bristol, Penn., feeding upon the frost-bitten leaves of *Nicotiana tabacum*.

CONCLUSIONS.

That the abnormal forms described above should present such curious deviations from the ordinary normal type, is to me a rather interesting occurrence. That they are to be considered as the effects of a legitimate cause is a settled conviction in my mind. What the cause is it will be my aim to show. Happening at a period when the leaves of plants show a diminished state of vitality, and are assuming the characteristic hues of the season in consequence of the introduction of chemical changes into their parenchymatous material, it seems that the variations are in some way connected with *defective nutrition*. The unusually small sizes of the larvae, when compared with the normal forms, add great weight to such an opinion.

It will be seen that the colors of the caterpillars rival those of the changing leaves. In few cases all the transitional color stages from the natural one of the larva to that which is last assumed, were distinctly observed by the writer, thus clearly proving the two facts to be connected with each other in the relation of effect and cause.

If the beautiful and varied shades of green which many caterpillars present can be attributed to the green and granular chlorophyl of the leaves upon which they subsist, the conclusion must be irresistible that when chemical or other changes are inaugurated in the parenchyma of the leaf, thereby inducing color changes, the introduction of such food into the insect's economy must give rise to changes therein which will have a tendency to vary its external coloration and markings.

'Tis true that the variable colors of animals in many cases are brought about through the influence of the *will*. The changeableness of our ordinary *Hyla versicolor*, Lec., might be cited as an example, and the number of such might be prolonged to considerable length, but the cases are so numerous and so well known that it would not be advisable to give them notice in a paper like the present. In the above example the color variableness serves to conceal the animal from its enemies by adapting it to the colors of objects upon which it chances to place itself.

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I do not know of any recorded instance where the larvae of the countless numbers of our Lepidoptera possess a similar faculty. Indeed, had such a case been observed, especially in a single individual of any of the above genera, I should assuredly have characterized it as one where the animal possessed the power of altering its color, in accordance with the dictates of a "will principle," whereby its protection was secured. This power of adaptation to the colors of the insects' natural food, being protective in its character, would be preserved, and thus, in the course of time, all the individuals of the species would adopt it.

But I am satisfied that the will (for assuredly these humble forms of animal life are endowed with a small degree of it) has nothing to do with these color transformations, but aver that they are due to the effects of a changed nutrition, as specimens, as above asserted, were observed exhibiting the transitional stages.

It has been shown by a French experimenter, according to the *Chronique de la Society d'Acclimatation*, that by feeding silk-worms on the leaves of the vine, cocoons of a beautiful red have been obtained, and by the employment of lettuce, others of a rich emerald green. By another Frenchman, silk of a beautiful yellow, of a fine green, and of a violet have been obtained by feeding the silk-worms on lettuce or on white nettle. An essential condition to the success of the experiment is to feed the worms on the mulberry leaves during their early ages, and to change the food twenty days prior to the introduction of the chrysalis state.

There can be no doubt that the silk-bearing glands of the caterpillars undergo a certain degree of modification, consequent upon the introduction of foreign material into the insect's economy, whereby they adapt themselves to the absorption of the proper elements from the general circulation, necessary to give to the silk its characteristic colors. It is clear that the color of the silk depends upon the food of the larva. Such being a true statement of the facts of the case, why will not a changed condition of the same food, evolved in obedience to the action of chemical or physical forces in the parenchymatous matter of the leaves, have a similar tendency? If the different capacities of different leaves to produce diverse effects are due to the chemical activities at work therein, bearing in mind that the same simple elements enter into the composition of all leaves, why will not leaves undergoing chemical and physical changes have different effects upon the tender beings that appropriate them as food, as well as the same food in a stable condition?

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In caterpillars that exhibit different shades of green, their external appearances are due to the characteristic colors of their blood. If this blood undergoes changes, the muscles, tissues and other parts, which are the out-growths thereof, must evidently adapt their constitution and color thereto.

To my mind this theory seems perfectly plausible. Whatever cause may be assigned to account for the phenomena, there is no getting over the fact that the two are synchronous events.

A DISSERTATION ON NORTHERN BUTTERFLIES.

(Continued from Page 69).

BY WILLIAM COUPER, MONTREAL.

The meeting with *Papilio turnus* on the Island of Anticosti, astonished me, as I did not expect to find this butterfly so far north in the Gulf of St. Lawrence. Only two specimens were taken during the season, and old settlers say that it is always rare. Anticosti is evidently its most northerly limit, as it does not occur on the opposite shore of Labrador. It is common at Halifax, N. S., and in many localities along the south side of the St. Lawrence, until we reach the lake and rocky regions on the heighth of land from which the Assomption river flows north of Montreal. Plants of the family *Oleaceæ* are generally selected by *turnus* as food of the larvae. They feed on *Fraxinus trifoliata* and probably the Swamp Ash of the south. The Anticosti food plant of *turnus* is not known to me; it may be a species of *Fraxinus;* whichever it is, the Island of Anticosti, which stands between latitudes 49° and 50°, is evidently the most northern range of that class of plants tending to the existence of this butterfly.*

* NOTE.—Mr. Scudder gives the following food plants of *P. turnus:* Apple, wild-thorn, choke cherry, cultivated cherry, alder, tulip, bass-wood, oak, black ash and birch. The former eight do not grow on Anticosti, but the latter two may Mr. Saunders found them feeding on cherry—" CAN. ENT., vol, i, p. 74."

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The Island specimens are smaller, and the dark portions of their bodies blacker than those of the west and south. Although undoubtedly *turnus*, they exhibits sufficient change of color to claim attention. Possibly the larval food is the power whereby this variety is produced. I have not had an opportunity of comparing specimens of *turnus* from widely separated localities, but it is a fact that those occurring in the latitude of Anticosti are different from the *turnus* of the south and more temperate latitudes of America.

The dark color observable in the Anticosti *turnus* supports my view that boreal insects, especially the Diurnals of high latitudes, are blacker where the dark scales occur than their congeners of the south. The fact that *Papilio glaucus* var. *turnus* * feeds on the Hickory, while *turnus* has not been found feeding on the leaves of this tree, is, in part, evidence that although the variety is thus attracted by change of appetite to an unusual plant, the true form *(turnus)* holds to those food plants which have been recorded by the early writers on Entomology.

I took a few specimens of *Colias* on Anticosti last July, which Mr. Strecker informs me are *philodice*. † This is another rare butterfly on the Island, where its habits differ from those found at Quebec. The Anticosti *philodice* is a difficult insect to capture; its flight is rapid and continuous during the occasional hours of its appearance, and it is only towards the end of July, when the weather becomes cold, that it can be easily approached. ‡ When it alights on a flower, instead of being erect on its feet, it lies sideways, as if to receive the warmth of the sun. Here, then, we have the most northern *habitat* of *Colias philodice* almost on the dividing line between the Canadian and Arctic Insect Fauna.

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* NOTE.—See CAN. ENT., vol, v, p. 9.

† NOTE.—To my subscribers I distributed an equal share of what I supposed were two species of *Colias*, taken last year on Anticosti, and one of each was sent to Mr. Grote, who did not include them in his article on the butterflies of that island.

‡ NOTE.—Its habits are similar to *Colias edusa* of Europe, which has a lively flight. Mr. Coleman says that "his pursuer has need of the seven league boots, "with the hand of Mercury, to insure success in the fair open race, if that can be "called a race at all, between a heavy biped struggling and perspiring about a "slippery hill-side, such as *edusa* loves, and a winged spirit of air, to whom up-hill "and down-hill seems all one."

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I believe that the most expert Entomologist would pronounce the Anticosti *philodice* different in habit from those found in the vicinity of Canadian cities. There appears to be a difference of opinion among Entomologists in reference to the variations in this insect. Mr. Edwards, of West Virginia, says: "I suspect that at least two species are passing "under the name of *Colias philodice*. The species is known to vary "widely, but some of the supposed varieties are extreme—almost too "much to be considered varieties, unless proved to be so by actual "breeding from the egg."

The only correct method by which to arrive at a conclusion as to the species constituting the genus *Colias*, would be the tracing of the imago (true form or variety) to the plants on which it deposits its eggs. It is possible that eggs deposited by a single female on two distinct American plants may produce larvæ showing variation from each other and from the ordinary coloration of larvæ of the original type, which may have been described in another latitude, and taken on a third food plant. These variations are known to occur, and a wide difference is seen between many species which systematists term representative American forms of European types. There is no question that great deviation exists between the species which are found on the two Continents, and the cause of such variation is what is now wished to be arrived at. We find certain butterflies localized or kept within a certain range, because climate restricts the growth of the bulk of that class of plants on which they feed. In such a case, one hundred examples of the butterfly will probably show no more variation than is general between the sexes, and I give *Pieris (Ganoris) borealis* as an illustration of this fact. Larvæ of the greater portion of North American Diurnals are said to feed on from two to ten distinct plants, and I am of opinion that it will yet be proved, when proper attention is given to Entomology in connection with Chemical Botany, that many of the perplexing varieties occurring among the true forms are produced by the food * which sustain the larvae.

* NOTE.—W. S. Coleman, in his remarks on the brilliant metallic spots which adorn the chrysalides of butterflies, says: "This golden effect is produced by a "brilliant white membrane underlying the transparent yellow outer skin of the "chrysalis *(Cynthia cardui)*, and it may be imitated, as discovered by Lister many "years ago, by putting a small piece of black gall in a strong decoction of nettles; "this produces a scum which, when left on cap-paper, will exquisitely gild it, without "the application of the real metal."

Late experiments made by a French Entomologist on caterpillars of a Bombyx,

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The species comprising the genus *Grapta* of this country, are subject to very perplexing variations. Mr. Edwards, in vol. v, p. 148, CAN. ENT., writes that Mr. Mead of New York, by experiment, identified *Grapta dryas* with *comma*. Two females of *Grapta dryas* were tied in a muslin bag, which was attached to a branch of Hop-vine, on the 3rd of July. "The result was a large number of eggs laid on the leaves and in the "bag." Tne eggs were all hatched on the 5th, and the first ones began to change on the 21st (he does not state the month, but as the imagines appeared on the 30th, I suppose the time to be August). "Towards "maturity some of the larvæ were white; the others were black, like the "larvae represented in Mr. Edward's plate of *comma*."

Here, then, is one experiment with "upwards of sixty" larvae, of what is said to be the product of *dryas*, resulting in giving imagines of true *comma*. As Mr. E. does not state how many white adult larvae were seen, it appears to me that this experiment, although a good one, does not prove the leaves of the hop to be free from eggs of another variety, and it may be possible that a female of *comma* visited that vine prior to the bag being placed over the branch. We have no direct evidence that all were the product of *dryas*.

Messrs. Edwards, Saunders, Scudder and Mead deserve great credit for their labors in metamorphic Entomology, but it appears to me that a link is missing—the *admixture* of the sexes prior to the deposition of the eggs. Were the *dryas* females the selection of *comma* males?

As illustrating the confusion in which the species of *Grapta* stand at present, two specimens sent to Mr. Edwards were stated by him to be *progne* and *gracilis*, and two similar ones sent to Mr. Strecker were reported as *faunus* and *comma*. *Faunus* is taken on Anticosti, and I am therefore inclined to think that the latter is dimorphic with *gracilis*. I found a larva of a *Grapta* feeding on wild currant, on Anticosti, a description of which was sent to Mr. Edwards, of West Virginia, who says: "I don't know what to make of the larva of *Grapta* you describe.

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were as follows: "It was ascertained that silk worms fed on vine leaves yielded silk "of a red color; when they had lettuce alone they gave cocoons of an emerald green; "nettle leaves produced violet silk, and it was also found that numerous combinations "of colors were the result of a varied diet of mixed leaves, fed during the last 20 "days of the larva period. Yellow, red, green and violet seem to be the colors most "successfully produced."

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"It would not appear to be that of *progne*, which feeds on currant, as that "is olive brown in color, and this color covers nearly all the surface. "*Comma* has a yellow skin in some of its phases, with black marks. At "other times it is black, with yellow marks. It varies greatly. I do not "know that it feeds on currant. *Faunus*, Scudder thinks, is dimorphic "with *gracilis*. I don't. The larva of *faunus* feeds on willow. It may "have other food plants, but so far we only know of willow; and it "looks like the larva of *C. album*, of Europe; that is fore-half rusty "red, hind-half white, so that your description does not fit that."

Mr. Edwards, in his remarks on larvae raised from the females of *interrogationis*, describes them as exhibiting "every distinct type of "coloration, and that either type of larvae produced either sex or form "of butterfly indifferently." *G. interrogationis* has been found feeding on several plants, one of which is *Tilia pubescens*, and it will surely be conceded that there is a marked difference between the taste of the leaves of the hop and linden. If the color of a larva is affected by food taken into its system, does it not appear reasonable that the imago issuing from it will be more or less marked? Say, for instance, that *Grapta comma* feeds on two distinct plants, and that a male whose larva fed on the hop, took for its mate a female which fed on elm. In all probability a versicolor butterfly would be the result, although the form would be that of *comma*. It is on the ground of finding northern species confined to a single plant, and which presents no varieties, that I conclude that such as are extremely phytophagic are those which produce the greatest number of varieties, while their forms are lessened or extended in accordance with geographical situation. *

There are a few other well marked species inhabiting the north belonging to *Lycaenidæ* and *Hesperidæ*, but as the previous remarks apply equally to them, I shall not extend the matter. My object is to ventilate

* NOTE,—Coleman, in his "British Butterflies," remarks on the variety *Gonopteryx cleopatra*, of Europe, that M. Boisduval has proved that *G. rhamni* and the former are identical, and in a foot note adds that "they are two varieties, but "why they fly together he cannot explain; but it is possible there may be a con-"stitutional difference between individual insects, just as we see that of two English-"men going to a hot climate—one will brown deeply, while the complexion of the "other will hardly alter, although exposed to the very same external influence." In another portion of Coleman's book he thinks it possible that *Colias edusa* var. *helice* may be a male between *C. edusa* and *C. hyale*.

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the subject, in order that it may be more thoroughly investigated by those who have leisure. The theory advanced is, I think, a reasonable one, and is based upon what I have noticed in my rambles during a number of years in the woods and fields.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 77.)

ERRATA.

Page 73, line 1, for "costa" read *costal vein.*
" " 3, for "costal" read *subcostal.*
" " 23, for "place" read *plead.*
Page 75, line 7 from the bottom, for "there" read *then.*

PHILONOME, *gen. nov.*

The little insect which I have made the type of this new genus, unites in itself the characters of several genera.

Tongue naked, about as long as the maxillary palpi, which nearly conceal it. The maxillary palpi are about as long as the labial palpi and in the dead insect are laid upon the coxae; they are rather densely scaled, the scales being somewhat roughened. The labial palpi ascend about half way to the vertex; the first and second joints are short; the second has a minute tuft at the end beneath, and the third is about as long as the first and second together, and somewhat roughened with scales. Face broad, smooth, with appressed scales and much retreating; vertex roughened, with a large tuft of erect scales which extends down between the base of the antennae; no ocelli; eyes moderate, visible from beneath, but concealed above by the large eye-cap which clothes the somewhat swollen basal joint of the antennae. Stalk of the antennae simple, about two-thirds as long as the primaries.

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Primaries lanceolate, almost caudate; the costal vein runs near the margin, which it reaches at about its middle. The subcostal sends two branches to the costal margin from near the end of the discal cell, which is closed rather acutely by the union of the subcostal and median veins. The first of these branches is given off at the point where the subcostal bends towards the median, and the second is given off almost from the apex of the cell. The median vein is unusually large and distinct, and from just behind the middle it sends a branch to the dorsal margin, from the end of the cell it sends a furcate branch also to the dorsal margin; from the apex of the cell a discal branch, which is almost continuous with the median, passes to apex, becoming trifurcate near the apex, one of its branches going to the costal margin near the apex, one to the apex and one to the dorsal margin near the apex. One or more tufts of raised scales.

Hind wings linear lanceolate; costa somewhat naked from the base to the basal fourth, and from thence excavated to the apex; the costal vein is close to the costa and enters it about the basal fourth; the subcostal proceeds to the apex; behind the middle it sends two branches to the dorsal margin; the median is furcate behind the middle, close to the margin, both branches entering the dorsal margin. Cell unclosed.

P. Clemensella. N. sp.

Palpi, face and eye-caps white; tuft reddish orange; antennae pale reddish orange; thorax white, with a reddish orange narrow stripe just before the apex, and a spot of the same hue on each shoulder. Primaries reddish orange, with two white basal streaks, one median, the other dorsal, the latter continuous with the white of the thorax, and extending to a small raised tuft of brown scales just before the middle of the dorsal margin; from the tuft the dorsal white streak is deflexed obliquely to about the middle of the wing, where it intersects at an acute angle the median basal white streak; at the apical third of the costa is a rather long oblique costal white streak, which is produced along the extreme costa towards but not to the base; apical portion of the wing dusted with dark brown. Ciliae whitish, with an oblique, rather wide streak of reddish orange, dusted with brown, resembling the "hook" of many species of *Gracillaria.*

Al. ex. scarcely ⅓ inch. Kentucky. Larva unknown.

I have named it in honor of Dr. Clemens, who may be called the father of this branch of Entomology in this country.

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ARCTIA ARGE, Drury.

BY PROF. S. H. PEABODY, AMHERST, MASS.

A moth taken by an evening lamp, May 25, 1873, on that night and the next day laid eggs which hatched June 14. The larvæ fed freely on the leaves of the common narrow-leaved plantain, *Plantago lanceolata*. The earlier moults were not observed with care; the last two occurred June 23 and July 1.

July 6, the larvæ ceased feeding and next day began to spin their cocoons in the breeding cage. July 26, imagos appeared, copulated and laid eggs for a second brood. Other imagos appeared at about the same time from without, showing the species to be double brooded. The cycle of transformations occupied 42 days from the hatching, 62 from the laying of the egg.

When the larvæ ceased feeding they were 1¾ inches long, ¼ inch in diameter, tapering slightly to each end.

Head small, black, marked in front with an impressed inverted λ. Fore legs black; pro-legs yellow with black fringe.

Body dark brown; a white dorsal stripe, and midway to spiracles a white lateral stripe, shaded to orange on each segment; spiracles black; an orange spot above each, and a wavy white line beneath. Underneath dirty gray; on each segment twelve black tubercles, two on each dark stripe, clothed with long white hairs.

The moth is quite abundant in this locality.

EDITORIAL SUMMARY.

The Butterflies of North America, *by W. H. Edwards—Second Series.*—We are much pleased to be able to announce that the first part of the second volume of this admirable work will be issued during the present month, by Messrs. H. O. Houghton & Co., Riverside Press, Cambridge, Mass., the succeeding parts to appear quarterly, with five plates in each part. The illustrations which adorn the pages of Vol. 1 are admirably truthful and life-like, and we have no doubt but that the forthcoming volume will in this respect quite equal its predecessor. The talented artists who were engaged upon the plates of the previous volume,

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Miss Mary Peart and Mrs. Bowen, will execute the plates of this also. Illustrations of the eggs and larvæ, as well as the butterfly, in many cases will be given, which will add greatly to the interest of the work. Price $2.50 per part. We bespeak for this volume an enlarged circulation.

FRANCIS WALKER, of the British Museum, has lately published a supplement to his Catalogue of Hemiptera; also the first part of a general list of Diptera. Copies of these pamphlets may be had from E. W. Janson, 28 Museum Street, London, W. C., England.

WE HAVE received a copy of a Memorial to the Legislature of Massachusetts from the American Academy of Arts and Sciences, setting forth the desirability of a new and thorough survey of the state in which besides the usual geological matter, there should be "full descriptions and truthful illustrations of the animals and plants, including their natural history, transformations, and relations to man and his requirements, said reports to be prepared with special reference to an intelligent use by the people." The State could not make a wiser use of its funds. We heartily wish the memorialists success, feeling sure that in such a publication Entomology will receive its due share of attention.

A NEW ENTOMOLOGICAL MONTHLY.—We are pleased to learn that the Cambridge Entomological Club, organized last autumn, have determined to issue an organ to be called "Psyche," a 4-paged monthly, to begin with. The first number will be issued in a few weeks. We commend the Cambridge Club for their enterprise, and shall gladly welcome their little sheet, and sincerely hope it may live and grow.

BULLETIN OF THE BUFFALO SOCIETY OF NATURAL SCIENCES.—We have received No. 4, which completes the first volume of this valuable publication. The present part contains eight plates, making eleven in all which have appeared in the volume of 289 pages. No. 4 contains the following Entomological papers: "On the Butterflies of Anticosti," "On Eight Species of Noctuidæ," and "Determination of Brazilian Sphingidae Collected by Mr. Chas. Linden," by Aug. R. Grote; "Notes on the Species of Pasimachus," by John L. Le Conte, M. D.; "The Two Principal Groups of Urbicolae," "Note on the Species of Glaucopsyche from Eastern North America," by Samuel H. Scudder; "Notes on North American Lepidoptera," "Description of Two New Noctuidae from the Atlantic District," by H. K. Morrison; "New Phalaenoid Moths,"

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"Rectification of Treitschke's Use of Hubner's Generic Term 'Cymatophora,'" by Leon F. Harvey, M. D. Price of this volume complete, Three Dollars. Part 1 of vol. 2 is now in hand, and will shortly appear; it will contain, among other articles, a catalogue of the Noctuidae of North America, embracing nearly 800 names, by Aug. R. Grote, with one colored plate. The subscription for the new volume will be Four Dollars. Remittances should be sent to Leon F. Harvey, M. D., Buffalo, N. Y.

CATOCALA RELICTA.—Mr. Robert Bunker, of Rochester, N. Y., has sent us a very nice photograph of an unusually dark female specimen of *relicta*. He says: "It is well known that this species alights usually on white surfaces; the specimen from which this photograph was taken was captured on a surface as dark as itself."

BOOKS RECEIVED.

Proceedings of the Boston Society of Natural History, vol. xvi, part 2, June, 1873—Jan., 1874, with two plates and several wood-cuts.

On the Oviposition of the Yucca Moth, from the American Naturalist, pp. 4, by Prof. C. V. Riley.

Controlling Sex in Butterflies, from the American Naturalist, pp. 9, by Prof. C. V. Riley.

The Grape Phylloxera, from the Popular Science Monthly, pp 16, with seven cuts, by Prof. C. V. Riley.

The Grape Phylloxera, False Theories. From the New York Weekly Tribune, by Prof. C. V. Riley.

Lepidoptera, Rhopaloceres and Heteroceres Indigenous and Exotic Part 9, with one colored plate containing figures of eleven species of Catocala, by Herman Strecker, Reading, Pa.

Note on the Species of Glaucopsyche from Eastern North America, 8vo., pp. 2, by Samuel H. Scudder, Cambridge, Mass.

The Two Principal Groups of Urbicolae (Hesperidae, Auct.,) 8vo., pp. 2, by Samuel H. Scudder, Cambridge, Mass.

The Pterostichi of the United States, from Proc. Acad Nat. Sci., Philadelphia, July 27, 1873, pp. 19, by John L. Leconte, M. D.

Synonymical Remarks upon North American Coleoptera, from Proc. Acad. Nat. Sci., Phila., pp. 16, by John L. Leconte, M. D.

Notes on the Species of Pasimachus, from Bul. Buffalo Soc. Nat. Sci., pp. 8, by John L. Leconte, M D.

On the Origin of Insects and Remarks on the Antennal Characters in the Butterflies and Moths, from Proc. Amer. Assoc., pp. 3, by Aug. R. Grote.

The Natural History of a Polymorphic Butterfly, from the American Naturalist, May, 1874, pp. 10, by Samuel H. Scudder.

Report Dept. Agriculture, Washington, April and May.

Science Gossip, March and April.

Nature to April 16th.

Le Naturaliste Canadien, Mars et Avril.

The Zoologist, March and April.

Newman's Entomologist, March and April.

Journal of Education, Feb'y.

Prairie Farmer to May 9.

Indiana Farmer to May 2.

Canada Farmer to May 1.

Western Rural to May 9.

Bruce Reporter to May.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., JUNE, 1874. No. 6

ON SOME OF OUR COMMON INSECTS.

16.—*THE GOOSEBERRY SAW-FLY (Nematus ventricosus*, Klug.)

BY THE EDITOR.

This prolific pest, known also in the larval state as the Currant Worm, is now so widely disseminated, and, at this particular season of the year, so abundant and destructive, that it may well be classed among our commonest insects, and is one in which all cultivators of the gooseberry and currant must take some interest.

The Saw-flies, the parents of this troublesome brood, usually spend the winter in the chrysalis state, enclosed in a tough, papery-looking, silken cocoon, sometimes on and sometimes under the surface of the ground, and occasionally fastened on the stems of the currant or gooseberry bushes on which they have been feeding, or in some sheltered spot near by. They make their appearance very early in the season, usually about the third week in April, but sometimes a week later, depending on the temperature; and by the time the gooseberry bushes are bursting into leaf, these enemies have paired, and the females are ready to deposit their eggs on the new and tender foliage. The gooseberry bushes develope leaves before the currant bushes, and whether it is from this cause alone or from a preference for the gooseberry foliage, we know not, but we find that the gooseberry is the first attacked, and often, if let alone, many bushes will be stripped quite bare of foliage before the eggs deposited on the currant are hatched; on this account the gooseberry bushes require the first attention.

Both male and female flies are represented in fig. 16, but magnified. The upper one (*a*) is the male, *b* the female; the hair lines below show

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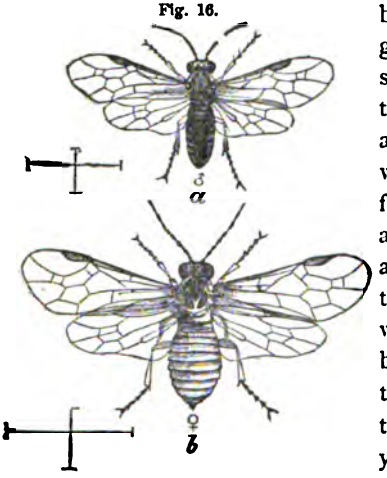
their natural size. The male is nearly as large as the common house-fly,

Fig. 16.



but with a more slender body and glossier wings. Its head is black, spotted with dull yellow, with the antennae brownish black; the thorax or anterior portion of the body is black, with a yellow spot at the base, and in front of each of the fore wings; the abdomen or hinder portion is black above, yellowish underneath and at the tip. Its legs are bright yellow; the wings glossy, with black or brownish black veins. The female is larger than the male and differs from it chiefly in the color of the body, being mostly yellow, instead of black. These flies are active only during the warmer parts of the day; at other times they are quiet, indeed almost torpid.

The eggs are laid on the surface of the larger veins or ribs on the underside of the leaves; they are arranged in long and regular rows, as shown in fig. 17, each female depositing about a hundred or more. We have counted as many as 118 squeezed from the body of a female just escaped from the chrysalis, and as the eggs are then very soft and easily ruptured, it is probable that some of them were broken in counting, and thus escaped notice. This process of egg-laying is continued throughout May, so that you have eggs hatching almost daily during the latter part of the month, on bushes which are, perhaps, covered with worms from half an inch to an inch long. It is probable that the female fly lays her stock of eggs at one time, and that the subsequent deposits are made by those who have escaped later from the pupa state. The eggs, as found on the leaves, are about one-twentieth of an inch long, four times as long as broad, rounded at each end, and having a

Fig. 17.

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whitish glossy surface. As squeezed from the body of the insect they are not much more than half this size, which indicates that they must expand considerably after being laid. The exterior of the egg is thin and elastic, and contracts and shrivels up as the young larva escapes ; the usual duration of the egg stage is from a week to ten or twelve days.

The larvae or worms, when first hatched, are about one-twelfth of an inch long, with a greenish white, semi-transparent body and a large head, having a dark round spot on each side. At first they eat small holes in the leaf on which they are placed, as shown at 2 and 3, fig. 17, feeding in company, from 20 to 40 on a leaf, the soft parts of which they soon consume, leaving nothing but the frame-work ; as they increase in size they eat the veins as well down nearly to the foot-stalks, and, travelling from leaf to leaf, they soon strip the branch on which they have been located, when they spread to other parts of the bush, which is sometimes stripped quite bare of foliage by these marauders in a few days.

Fig. 18 represents the larva nearly full grown. It is then about three-fourths of an inch long, with a black head and a bluish green body, becoming yellowish on the hinder segments and on the sides. Its whole upper surface is thickly covered with small, shining black tubercles or raised dots, from each of which arises a single black hair. Low down on each side, in a line with the spiracles, is a row of larger black tubercles from each of which there arises several short black hairs ; the terminal segment has a patch of black above. The under surface is pale bluish green, growing yellowish towards the extremities, with a few faint brownish dots ; feet nearly covered with patches of black. Prolegs—of which there are seven pairs—pale greenish. After the last moult, just before entering the chrysalis state, it becomes of a uniform plain green color, tinged with yellow.

Fig. 18.

Having completed its growth, its chief concern now is in the selection of a suitable place in which to pass the chrysalis stage of its existence.

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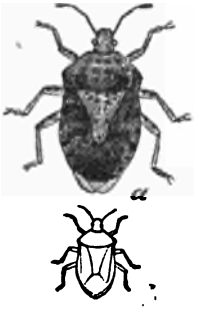
Such a spot having been fixed on, the larva begins to contract the length of its body and to spin a cocoon over itself, which, when finished, is nearly oval, smooth, of a brownish color and papery texture, and within this it changes to a small brown chrysalis, from which the fly escapes late in June or early in July. Shortly after this eggs are again deposited, from which another brood of worms are hatched; these complete their growth before summer closes, and in most instances change to chrysalids before winter, and thus these tormentors lie dormant until spring comes round again.

There may possibly be more than two broods during the season; it is certain that there are not many weeks during the whole of summer when you cannot find the larvae on the bushes in some stage of their growth. It is well known that the flies composing the separate broods do not all appear at one time; some are weeks later than others, and their progeny are later in proportion; but whether this tardiness in maturing on the part of some specimens is sufficient to account for the almost continual presence of the larvæ from May to September, we are unable at present to decide.

The Saw-fly has natural enemies, but, unfortunately, they do not as yet appear anywhere in sufficient numbers to materially lessen its increase. One small parasitic insect attacks the egg, and there are two other species which prey upon the larva. Besides these we have another friend in a member of the Heteroptera or true bug family, see fig. 19. This insect is about the size of a common Lady-bird, with the head, thorax and legs black, and the abdomen red, with an elongated black spot in the centre, crossed by a whitish line. On approaching one of the worms they thrust into it their sharp proboscis and quietly suck its juices until it shrivels up and dies. In the figure this insect is magnified; the outline below shows its natural size.

Fig. 19.



a

It is fortunate that we have a remedy which is sure and speedy, and while it brings sudden death to the worm, does not injure either the bushes or fruit. We refer to powdered Hellebore, which is best used by mixing two tablespoonfuls of the powder in two or three gallons of water, and showering it on the bushes with a watering pot.

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ON TWO NEW SPECIES OF NOCTUIDÆ.

BY H. K. MORRISON, OLD CAMBRIDGE, MASS.

Hydræcia semiaperta. Nov. sp.

Antennae serrate. Collar arched, ochreous at its base, brown above. Behind the collar the usual longitudinal sharp-edged thoracic crest. Abdomen with a thick, short tuft on its first segment. ♀ with an extended ovipositor. Anterior wings above brown, with ferruginous shades. All the transverse lines dark brown, regular and distinct. Half line present. Interior line undulate above the median nervure; at the latter point it is bent inwardly, and advances in a nearly straight line to the inner margin. Median shade very distinct, broad, not clearly defined along its edges, strongly angulated on the median nervure, and then nearly touching the reniform spot. Exterior and subterminal lines obliterated on the costa, below distinct, sub-parallel, broadly undulating, the former dentate between the median branches.

Ferruginous stains on the median and subterminal spaces, particularly just before the subterminal line and between and beyond the ordinary spots. Terminal space in fresh specimens showing a purple reflection. Orbicular spot small, ferruginous, ringed with brown. Reniform spot long and narrow, pure white, crossed by the black nervules, its upper half frequently more or less overspread with ferruginous shades. Nervules black, with irregularly occurring white atoms. Fringes long, edged with a basal and exterior black line.

Posterior wings dark fuscous, lighter at the base; a black line at the base of the brown fringe.

Beneath, the most conspicuous feature is the broad, black, wan exterior line, which extends over both wings. Discal dots present. On the anterior wing, before the exterior line, the wings are blackish. The costa subterminal and terminal spaces of the anterior, and the whole of the posterior wings violaceous brown, sprinkled with numerous black atoms.

Expanse, 34 to 37 m. m. Length of body, 16 m. m. *Hab.* Mass., New York. Not uncommon. Coll. of H. K. Morrison.

In color this species most nearly approaches *sera*, G. & R.; in the form of the spots, *lorea*, Guen.

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The white reniform spot is not a sexual character, as in *nictitans*, Linn., but common to both sexes.

The regular, distinct, median lines, particularly the broad angulated median shade, the white reniform, and the continuous exterior line beneath, afford a ready clue to its determination.

Hadena congermana. Nov. sp.

Palpi, vertex, the upper portion of the collar, and the tegulae ferruginous brown. The basal portion of the collar, a broad, dorsal, thoracic band, and the abdominal tufts dull ochreous. Anterior wings uniform dull red, with the nervules brown. The transverse lines, with the exception of the subterminal, almost entirely obliterated, represented by white dots on the costa and nervules, but in some cases the ground color is slightly lighter along the ordinary course of the lines. Subterminal line more distinct, showing the usual ≷-shaped marking between the median nervules, set off and followed by a lighter line. Terminal space lighter than the rest of the wing, particularly at the apex and internal angle, where are formed irregular ochreous spots. Orbicular spot reduced to a pale dot, encircled with brown. Reniform as in the common *sputator* Grote (*Bul. Buf. Soc. Nat. Sci., vol. i, p. 190*), kidney-shaped, with an internal brown annulus following the shape of the spot. Posterior wings white at the base, with a broad, diffused light fuscous terminal band. Beneath the wings are yellowish white, with reddish atoms terminally and traces of the exterior line. Expanse, 35 to 38 m. m. Length of body, 18 m. m.

A rare species. *Hab.* New York, and one specimen taken at Beverly, Mass., June 24, 1867, by Mr. Edward Burgess, who has generously given me this and many other interesting species of Noctuidae.

A very detailed description of this species is not necessary; it is another member of the same little closely related group of *Hadena*, of which *dubitans*, Walk., and *sputator*, Grote, are the only species. It is the smallest of the group (expanding 35 to 38 m. m., while *sputator* expands 42 to 46 m. m., and *dubitans* 48 to 50 m. m.,) but it resembles nearest in color *dubitans*, the largest.

Its best character is the orbicular spot, reduced merely to a whitish dot, surrounded with a brown ring. In the other species the orbicular, although obscured by the ground color, is of the usual size. It can be easily distinguished by the dull red ground color of the anterior wings, the almost white posterior wings, the dorsal thoracic band, and the white conspicuous reniform.

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THE PRESERVATION OF CATERPILLARS BY INFLATION.*

BY SAMUEL H. SCUDDER.

Many persons are deterred from collecting caterpillars by the difficulty and expense of preserving them in the ordinary way. The easy and inexpensive method of blowing up and mounting the pellicle is so little known in this country, that at the last meeting of the American Association, only one entomologist besides myself had ever seen the operation; since then others have tried it, and been delighted with its simplicity. In the hope of inducing all our entomologists to experiment for themselves, the following explanation of the process has been prepared.

It should be premised that caterpillars may be prepared in this way, so as to retain their colors far better than by any other method, and often to to be fit subjects at any subsequent time for the artist's pencil; the most delicate processes may be preserved uninjured, and the examination of hairy or spiny appendages made even more readily than during life. Specimens taken from spirits, unless absolutely naked, are always difficult to examine from the matting of the hairs; and the internal organs can seldom be studied, even in the rudest manner, unless the greatest care has been bestowed upon their preservation; in fact, no specimen can be fitted by any process for the study of both internal and external organizations, and for the latter, no method of preparation compares with that of inflation.

The instruments necessary for the operation, besides the tools in the hands of every entomologist, are a small tin oven, a spirit lamp, a pair of finely pointed scissors, a bit of rag, a little fine wire and a straw.

The oven is simply an oblong tin box, about 2½ inches high, 2½ inches wide, and five inches long; the cover is of glass, and one end of the box is perforated by a circular hole 1¼ inches in diameter. It would be well to have this end of glass, and the opposite end should be movable; the oven rests upon an open standard of twisted wire or riveted tin plates, as in the woodcut (fig. 20.) No soldering should be used upon the oven or standard, as it would soon be melted. Mr. Riley suggests that there would be an advantage in having the front end of the standard higher than the back, as he has shown in the sketch. He also proposes

*From advance sheets of the *American Naturalist.*

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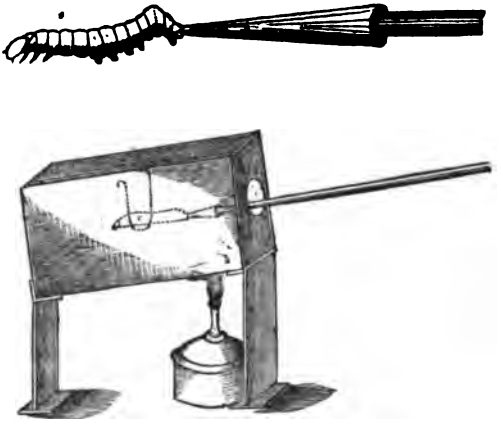
a movable wire loop, indicated in the woodcut by the dotted line,* but this would seem superfluous.

The wire should be very fine and annealed; the best is that wound with green thread and used for artificial flowers. It should not be more

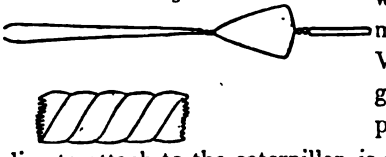
Fig. 20.



than half a millimetre in diameter; the cut represents it magnified nineteen diameters (fig. 21).

The straw. Mr. Goossens, of Paris, my courteous instructor in this art, who possesses a collection of nearly a thousand species of inflated caterpillars, uses nothing but ordinary wheat straw, choosing stout, dry pieces of various sizes, the cross section of which is perfectly circular; with these he inflates the smallest micros and the largest sphingidae.—Various modifications have been suggested; a glass tube drawn to a fine point, and provided with a pair of spring clips to attach to the caterpillar, is a favorite form; the Germans use this largely, and sometimes attach the caterpillar by threads passed around the anal prolegs. Dr. LeConte informs me that Dr. Gemminger uses a finely pointed tube with an elastic bulb attached, like a rubber syringe. Mr. Riley suggests (as his drawing represents) still another mode, which is to pierce a piece of soft wood along the grain with a fine heated wire

Fig. 21.



* The engraver should have made this loop hang from the edges of the oven.

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and then sharpen to a point the tube thus formed, to be inserted in the caterpillar; a tube is also inserted in the other end (see fig. 21.) For myself I prefer the simple straw.

The operation. Kill the subject by a drop of ether or by a plunge in spirits; if it be a hairy caterpillar, it should remain at least half an hour in alcohol, and then rest on bibulous paper for forty-eight hours; otherwise the hairs drop off in the subsequent operation. Then placing the caterpillar in the left hand, so as to expose its hinder extremity beyond the gently closed thumb and first two fingers, enlarge the vent slightly at the lower edge by a vertical cut with the scissors; next lay the larva either upon bibulous paper on the table, or upon soft cotton cloth held in the left hand, and press the extremity of the body with one finger, always with the interposition of cloth or paper, so as to force out any of the contents of the rectum; this process is continued from points successively farther back, a slight additional portion of the contents of the body being gently pressed out with each new movement. Throughout all this process great care should be taken lest the skin should be abraded by too violent pressure, and lest any of the contents of the body soil its exterior or become entangled in the hairs or spines; to avoid the latter, the caterpillar should be frequently removed to a clean part of the cloth or paper. When a portion of the intestinal tube itself becomes extruded, it should be seized with a pair of strong forceps, and, the head remaining in the secure hold of the left hand, the tube should be forcibly but steadily torn from its attachments; with this most of the contents of the body will be withdrawn, and a delicate pressure passing from the head toward the tail will reduce the subject to a mere pellicle.

The alcohol lamp is now lighted and placed in position beneath the oven; a straw is selected, of the proper size to enter the enlarged vent, and the tip, after being cut diagonally with sharp scissors, is moistened a little in the mouth (to prevent too great adhesion of the skin to the straw) and carefully introduced into the opening of the caterpillar; the process may be aided by blowing gently through the straw. When the skin is slipped upon all sides of the straw to the distance of nearly a quarter of an inch, without any folding of the skin and so that both the anal prolegs protrude, a delicate pin (Edelston and Williams, No. 19, is best) is passed through the anal plate and the straw.

By this time the oven will be sufficiently heated to commence the drying process, which consists simply in keeping the caterpillar in the

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oven, extended horizontally upon the straw by blowing gently and steadily through the straw, as one uses a blow-pipe. Too forcible inflation will make the caterpillar unsightly by distending unnaturally any spot that may have been weakened or bruised in the previous operation; the caterpillar should be kept slowly but constantly turning, and no harm will result from withdrawing the creature from the oven and allowing it to collapse, to gain breath or rest; only this relaxation should be very brief. The caterpillar should be first introduced into the oven while inflated by the breath, and so placed that the hinder extremity shall be in the hottest part, directly above the flame, for it is essential that the animal should dry from behind forward; yet not altogether, for as soon as the hinder part has begun to stiffen (which can readily be detected by withholding the breath for a second) the portion next in front should receive partial attention, and the caterpillar moved backward and forward, round and round over the flame. During this process any tendency of the caterpillar to assume unnatural positions may be corrected—at least in part—by withdrawing it from the oven and manipulating it; during inflation, the parts about the head should be the last to dry and should be kept over the flame until a rather forcible touch will not cause it to bend.

To secure the best results, it is essential that the oven should not be too hot; the flame should not be more than an inch high, and its tip should be one or two inches from the bottom of the oven.

When the skin of the caterpillar will yield at no point, it is ready for mounting. The pin is removed from the straw and the caterpillar skin, which often adheres to the straw, must be gently removed with some delicate, blunt instrument, or with the finger nail.

A piece of wire a little more than twice the length of the caterpillar is next cut, and, by means of forceps, bent as in fig. 21, the tips a little incurved; a little shellac* is placed at the distal extremity of the loop, the wire is held by the forceps just beyond this point, so as to prevent the free ends of the wire from spreading, and they are introduced into the empty body of the caterpillar as far as the forceps will allow; holding the loop and gently opening the forceps, the caterpillar is now pushed over the wire with extreme care, until the hinder extremity has passed half-way over the loop, and the shellac has smeared the interior sufficiently to hold

* To prepare this, the sheets of dark shellac should be preferred to the light, and dissolved in forty per cent. alcohol.

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the caterpillar in place when dry: the extremities of the parted wires should reach nearly to the head. Nothing remains but to curve the doubled end of the wire tightly around a pin with a pair of strong forceps and to place the specimen properly labelled, in a place where it can dry thoroughly for two or three days before removal to the cabinet.

For more careful preservation and readier handling, Mr. Goossens employs a different method, placing each specimen in a glass tube, like the test tube of the chemist. The wire is first bent in the middle and the bent end inserted in a hole bored in the smaller end of a cork of suitable size, so as nearly to pass through it; the loops are then formed as aboye; both ends of the cork are varnished, and a label pasted around the portion of the cork which enters the tube, thus guarding both specimen and label from dust, and the latter from loss or misplacement. After two or three days the cork with the caterpillar attached is placed in its corresponding tube, and the tube may be freely handled.

Modifications of this system will occur to every one. Dr. Gemminger uses a syringe for the extraction of the contents as well as for the inflation of the emptied skin. For an oven, the Vienna entomologists employ an ordinary gas-chimney, open at both ends and inserted in a sand bath, which prevents, perhaps, the danger of too great heat.

TRANSLATION OF THE SYNOPSIS OF THE GENERA OF EUROPEAN MYCETOPHILIDÆ.

BY FRANCIS WALKER, LONDON, ENGLAND.

The Diptera, generally considered, are less attractive than other orders of insects, and appear to be more insignificant, but are the most useful on account of their excessive abundance and of their purification of matter and thereby of the atmosphere. In like manner, the Diptera may be divided into more or less numerous and beneficial tribes, and the work assigned to the former is the removal of decaying substances. The fungus race is in subjection to the Mycetophilidæ, and are the means for the developement of the perfect state of the latter, according to the law whereby degradation precedes the attainment of a higher state, and this law is exemplified in minerals, plants and animals. In like manner the

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Mycetophilidæ among themselves exhibit much difference in utility and beauty, the former quality being exemplified by Mycetophila with its skipping and shuffling movements; the latter by the graceful form of Macrocera when it rests on a shady paling. The four following sub-families of Mycetophilidæ are distinguished from the others by each of them including more than one genus:

Sub-family MYCETOBINÆ.

A—Brachial vein and cubital vein forming a sessile fork... 1 MYCETOBIA
B—Brachial vein and cubital vein forming a petiolated fork.
a—Base of this fork nearer to the base of the wing than is the base of the 2nd hind areolet..... 2 DITOMYIA
b—Base of this fork more distant from the base of the wing than is the base of the 2nd hind areolet..... 3 PLESIASTINA

Sub-family CERATOPLINÆ.

A—Mouth elongated like a beak.. ... .1 ASINDULUM
B—Mouth not elongated like a beak.
a—Antennæ dilated; palpi not bent together.....2 CEROPLATUS
b—Antennæ not dilated; palpi bent together.....3 PLATYURA

Sub-family SCIOPHILINÆ.

A—Costal vein extending to the tip of the wing.....1 SCIOPHILA
B—Costal vein not extending to the tip of the wing.
a—Base of the 4th hind areolet much nearer to the base of the wing than is the base of the 2nd hind areolet.....2 EMPHERIA
b—Base of the 4th hind areolet a little nearer to the base of the wing than is the base of the 2nd hind areolet.
*—Second hind areolet with a very long petiole.....3 POLYLIPTA
* *—Second hind areolet with a moderately long petiole.....5 EMPALIA
c—Base of the 4th hind areolet in a transverse line with the base of the 2nd, or very near the base of the wing.....6 TETRAGONEURA
d—Base of the 4th hind areolet much more distant from the base of the wing than is the base of the 2nd hind areolet.....4 LASIOSOMA

Sub-family MYCETOPHILINÆ.

A—Three ocelli on the front.
a—Abdomen with seven segments.

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*—Proboscis not elongated.
†—Costal vein extending beyond the tip of the cubitus.
‡—Basal part of the cubital vein and middle transverse vein equally long.
§—Auxiliary vein not extending to the costal vein..... ..1 SYNTEMMA
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NOTES ON COLLECTING LEPIDOPTERA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

In collecting Catocalas at Ohio, Ill., I have found them, during July, invariably abundant upon Black Locust *(Robinia pseudacacia)*, which, at that time, exudes considerable sap from the holes made by borers. Last season I pinned rags, dipped in molasses, to three or four of these trees, and from the middle to the last of July obtained from them over thirty Catocalas of ten species. On suitable evenings I would visit the trees with a lantern and cyanide bottle; several times between sunset and ten

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o'clock, p. m., earlier or later, I had little success. I seldom used a net, preferring that a specimen should escape rather than capture it in a damaged condition.

In August and September decayed apples or pomace from the cider mill, spread upon trunks of trees, will attract the late species of Catocala such as *cara*, *concumbens*, &c., and a host of the lesser Noctuidae.

Limenitis misippus and *ursula* are also very fond of the juice of apples. I have often seen the former species feeding upon apples that were being sun dried, and both may be observed around apple trees upon which the fruit is over-ripe. Upon more than one occasion, by wetting my fingers with apple juice, and holding them near an *ursula*, as it sat upon a leaf above me, I have induced it to leave its perch and alight on my hand, where it would remain until the last drop was sucked up. Where the rarer species of this genus are found, it would seem that apple might be successfully used as a bait.

The objection to cyanide offered by Mr. Norman, in No. 1, Vol. vi, does not seem to me a sufficient reason for discarding it. Although cyanide certainly "renders the moths rigid," the difficulty can be overcome. My Catocalas, taken in the evening, remained in the bottle all night, and next morning were transferred to a close box. At noon they were soft enough to spread without difficulty.

NEW CANADIAN NOCTUÆ.

BY AUG. R. GROTE,

Curator of Articulata, Buffalo Soc. of Natural Sciences.

Perigrapha Normani, Grote.

♂ ♀. The eyes are hairy, the tibiæ unarmed. The collar is cut out in front and there is a slight tuft in front, on the dorsum of the thorax, while the sides of the patagia are determinate. Dark leather brown; thorax concolorous, with the inner edge of the patagia with a more or less obvious bordering of dark scales. Forewings shining leather brown, deepening in tint over costal region, somewhat darker mottled. Lines distinct, continuous, geminate, with lilac-grey centers distinctly con-

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trasting. Basal half line bent on median vein, continued to internal nervure. T. a. line nearly even, slightly outwardly arcuate, very slightly notched on costal and median veins. Orbicular very indistinct; it appears large, spherical, outlined by a ringed shade of a lighter brown than the ground color. Reniform large and wide, with a distinct darker inner annulus, and with an enclosed blackish stain on the median vein inferiorly. T. p. line like the first two transverse lines, exserted round the reniform, nearly even. There are three grey ante-apical costal dots, while the apices are distinctly washed with a grey shade, which obtains beyond the subterminal line over costal region on the terminal space. Terminal line very vaguely indicated. Hind wings whitish, with a vague fuscous terminal shade and the veins stained with blackish, darker in the female, fringes whitish. Beneath pale, with a common line appearing by blackish nervular dots and streaklets; a discal point on secondaries, which have whitish fringes, while beneath the fringes of the fore wings are brown (as above) and contrast. *Expanse*, 32 m. m. St. Catharines, George Norman, Esq.

Matuta. N. g.

Habitus of *Taeniocampa* and *Perigrapha;* the thoracic and caputal squamation is woolly. The eyes are, however, naked and lashed, not hairy, as in allied genera. The hind and middle tibiae are spinose, and the form is not flattened, as in *Glaea (Cerastis*, Led.) The ♂ antennae are simple, not pectinate, as in *Pachnobia.* The fore wings are broad, entire and widen outwardly, with full and rounded external margin. In color the species resembles *Ceramica picta;* the lines are obsolete, except the subterminal, which, with the ordinary spots, is grey. The thorax has the collar distinctly lobed, as in *Perigrapha*, and the sides are well defined; there seems to be no dorsal tuft, while the wings are broader than in that genus. The habit is that of *Taeniocampa* and *Lithophane;* the perfect insect has been taken by Mr. Geo. Norman, in May.

Matuta Catherina, Grote.

♂. Dark and deep red brown; the fore wings are brighter colored outside of the t. p. line, and at base below the median vein. The median transverse lines are hardly to be made out against the blackish red brown color of the wing; the t. p. line is seen to be single and regularly interspaceally scalloped and accented on the nervules. The stigmata contrast by their grey color; the orbicular well sized, spherical; the reniform

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proportionate and enclosing a blackish inferior stain as in allied genera. The subterminal line is quite distinct, being indicated by a line of powdery greyish scales, like the stigmata. There is an extremely fine grey, wavy terminal line *before* the margin, formed by the outer edging of the deeper tinted marginal line which appears as interspaceal points. Fringes light brown, cut by a fine darker hair line (preceded by a pale line) without the middle. Hind wings pale, much soiled with fuscous and with the pale fringes ruddy tinted. Beneath fuscous, with a rufous tinge, both wings rather dark, with discal marks and a broad, vague, common shade line. Thorax like fore wings; collar above with indistinct pale edging; palpal tips pale, as is the front, else the head is rufous. *Expanse*, 32 m. m. St. Catharines.

Besides the foregoing, Mr. Geo. Norman has secured specimens, in beautiful condition, of the following Noctuæ, on Catkins, in May:

Lithophane vulgaris, G. & R. (*socia* of my List); *Lith. disposita*, Morr.; *Lith. Bethunei*, G. & R.; *Lith. ferrealis*, Grote (allied to the European *L. semi-brunnea*, Haw); *Lith. laticinerea*, Grote.; *Morrisonia vomerina*, Grote; *Actinotia ramosula* (Guen.,) and *Taeniocampa alia* Guen. These species are mostly additions to the Canadian lists. It is improbable that *Taeniocampa instabilis* occurs in N. Am.; and *T. alia* has probably been mistaken for it.

The following species of European Noctuæ are credited to North America with apparent certainty:

Agrotis augur (Fabr.)
" *baja* (W. V.)
" *c-nigrum* (Linn.)
" *plecta* (Linn.)
" *fennica* (Tausch.)
" *conflua* (Treits.)
" *saucia*, Hubn.
" *segetum* (S. V.)
" *suffusa* (S. V.)
Mamestra grandis (Boisd.)
" *brassicæ* (Linn.)
Hadena arctica, Boisd.
" *rurea* (Fabr.)
Dipterygia pinastri (Linn.)
Euplexia lucipara (Linn.)

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Heliophila pallens (Linn.)
Pyrophila tragopoginis (Linn.)
Xanthia gilvago (W. V.)
Scoliopteryx libatrix (Linn.)
Plusia gamma (Linn.)
" *ni*, Hubn.
Anarta cordigera (Thunb.)
" *melanopa* (Thunb.)
Heliothis armigera, Hubn.
Euclidia cuspidea (Hubn.)

Besides the foregoing, other species are occasionally attributed to North America, such as *Hyppa rectilinea*, for which *H. xylinoides* is mistaken; *Agrotis nigricans*, for which *Agr. tessellata* is mistaken, etc. With the exception of the boreal species of *Anarta*, the foregoing list embraces all the European species I feel as yet at all sure are properly credited to North America.

ANNUAL MEETING OF THE MONTREAL BRANCH.

The first annual meeting of the Montreal Branch of the Entomological Society of Ontario was held on May 6th, 1874, when the following officers were elected for the ensuing year:

W. Couper, President; G. J. Bowles, Vice-President; F. B. Caulfield, Secretary-Treasurer; G. B. Pearson, Curator; Council—W. Hibbins, sen., C. W. Pearson, P. Knetzing.

The reports of the Council and Secretary-Treasurer were read, and on motion adopted. The Branch, although young, is in a prosperous condition, the expenses of the past year having been met, leaving a small balance on hand, and the list of members is gradually increasing. Owing to the lateness of the season but little field work has been done, but some rare captures have been made already. The Branch meets as usual at the residence of the President, No. 67, Bonaventure Street, Montreal, P. Q. All business communications to be addressed to the Secretary-Treasurer, F. B. Caulfield, 254, St. Martin Street, Montreal, P. Q.

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CORRESPONDENCE.

A THIRSTY SPIDER.

DEAR SIR,—

On the sixth of April my attention was drawn to a small black spider running on the inside of my window-sill. In the course of its travels it came to a drop of water that had trickled from the window pane, when it stopped and commenced drinking.

Wishing to see what it would do, I touched it with my finger, when it set off at a great rate; passing near another drop, it ran to it and again commenced drinking, this time turning out of its path in its eagerness to reach the water.

I have sometimes seen Lepidopterous larvæ drinking, but had never observed a spider doing so before.

F. B. CAULFIELD, Montreal, P. Q.

DYSAUXES MEDIASTINA.

DEAR SIR,—

Dysauxes mediastina, Hubner, Zutrage, figs. 505, 506, must be erased from the list of American Lepidoptera, the locality assigned to it by Hubner being erroneous. The figures quoted above are excellent representations of an Australian insect which I have received from New South Wales. This is not the only erroneous locality which has crept into Hubner's writings, as those who have studied the volumes will have discovered.

Yours truly,

R. H. STRETCH, San Francisco.

PLATYSAMIA COLUMBIA, *S. I. Smith.*

DEAR SIR,—

In March last I found a cocoon on a maple tree, in the east end of this city, which bore a very close resemblance to *P. cecropia*, only it was not much more than half the size. I compared it with Mr. Bowles' description of *columbia*, and as it differed in some respects, I supposed it to be *cecropia*. All doubts were, however, removed by the appearance of the imago on the 13th May, which proved to be a fine male specimen of *columbia*. I believe this is the first that has been taken in Montreal.

C. W. PEARSON, Montreal, P. Q.

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EDITORIAL SUMMARY.

We have received from our esteemed friend, J. A. Lintner, of Albany, N. Y., No. 3 of his Entomological Contributions, from the 26th Annual Report of the New York State Museum of Natural History, 8vo., 76 pp., with many cuts. These yearly contributions are valuable additions to our Entomological literature, giving us in terse language the facts and observations recorded by one of our most accurate and pains-taking fellow laborers. The present No. is divided into 12 chapters, in each of which much will be found to interest the practical Entomologist. The first is on the larva of *Eudryas unio* and allied forms. Then follow—"Transformations of some Bombycidae," "Descriptions of Larvae of some Bombycidae and Noctuidae," "Notes on New York Bombycidae and Noctuidae," "Descriptions of New Species of Cucullia," &c., &c. We trust Mr. Lintner will receive every encouragement from the directors of the New York State Museum in the prosecution of his valued labors.

The promised list of the Noctuidae of North America, by Aug. R. Grote, has come to hand. It is a goodly octavo pamphlet of 77 pages, with one colored plate illustrating eleven new species. The first 58 pages are occupied with the catalogue proper, which is conveniently indexed and gives evidence throughout of great care and labor in its compilation; the remaining pages are filled with descriptions of some 35 species, many of which are new. As stated in our last, this list will appear in the forthcoming number of the *Bulletin of the Buffalo Society of Natural Sciences*. For the convenience of Entomologists, separate copies have been struck off, which may be had by remitting $1.50 to the Secretary, L. F. Harvey, M. D.

Psyche.—The first number of this little Entomological monthly has appeared. It is nicely printed on good paper, and we doubt not, from the array of names of noted Entomologists composing the Cambridge Entomological Club, of which this is to be the organ, that it will be well sustained.

The Butterflies of North America, by W. H. Edwards.—Part 1 of the second series is just at hand, with five beautifully colored plates, in which the drawing and coloring are both elegant and faithful. We know of no illustrations so charming and correct as these are. If all the succeeding parts of the forthcoming volume equal in design and execution that which we are now noticing, vol. 2 will be a fitting sequel to vol. 1. Figures of the larva and egg in several instances accompany those of the perfect insect.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., JULY, 1874. No. 7

NOTES ON THE LARVÆ OF ARGYNNIS CYBELE, APHRODITE AND DIANA.

BY W. H. EDWARDS, COALBURGH, W. VA.

I am now able to give the results of my attempts at raising the caterpillars of the three Argynnides, *Cybele*, *Aphrodite* and *Diana*, from the egg, this past season. In August and early in September, 1873, females of *cybele* were easily obtained, and a few of *aphrodite*, which is a rare species here, and these were shut up in kegs, within which were placed pots of growing violets. The eggs were laid abundantly on the leaves and stems, and on the cloths which covered the kegs. There were soon several hundreds of *cybele* eggs, and many of *aphrodite*. About the same time, Mr. T. L. Mead, who was at Coalburgh, made an excursion to a region about fifty miles east of us, where *diana* had been previously found by him in some numbers, and brought back with him about sixty females, which were placed in kegs and boxes, also with violets either in pots or planted in earth in the boxes. Hundreds of eggs were so obtained of this species. The three species hatched in from seven to twelve days, and so far as was possible, the larvae at large were transferred to plants, but of course many were lost. In a few instances some of them were observed to feed on the leaves, but almost all began their hybernation at once after hatching, and fixed themselves on the under sides of the leaves, and especially in the grooves of the leaf-stems, where some of them were to be seen, extending quite down to the base of the stem. The three species were so nearly alike at this stage that *cybele* and *aphrodite* could not be distinguished apart by any glass I had, and *diana* differed almost imperceptibly from the others.

They were each about one-twentieth of an inch long, cylindrical, with brown heads; the body greenish brown, with rows of tuberculated darker colored spots, from each of which emanated a black hair.

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As the weather became cool the plants gradually lost their leaves by drying up; mould began to attack the decaying leaves, and I was compelled to transfer the caterpillars to fresh plants, which at this season I had much trouble in providing. In fact I had to raise a number of plants from off-shoots in the house, to be ready for any emergency. The transfer was effected by using a pin bent at the point. The larvae would curl up when touched, and were easily hooked and so moved. When placed on the new plants they would soon straighten out, and change position sufficiently to make themselves comfortable. But as the process had to be repeated several times as the winter progressed, a great many of the larvae were lost. I placed the pots in a small greenhouse about the 1st of January, hoping to see the caterpillars revive and commence feeding, and had the satisfaction soon after of seeing this desired result take place. On the 9th of January I noticed some of the *cybele* were active and had been feeding; on the 21st, *aphrodite* and *diana*. They very soon began to increase in size perceptibly, and were active in running about the leaves and in wandering off the flower pots. I should have lost these lively ones had I not confined them to the plants by glass lamp chimneys and glass globes. But in these the air was no doubt too confined for an *Argynnis* caterpillar (though a *Grapta* would have thrived,) for many died; and I came near losing them all in a way that I had not provided for, the gardener having taken occasion one day, when I was absent from home, to smoke the entire house with tobacco, forgetting to remove my pots.

From this catastrophe emerged about a score of *cybele*, half a dozen *aphrodite*, and a few of *diana*. These larvae all throughout this period grew very slowly, no doubt owing to the cooling down of the house at nights, so that it was the 27th of January before I was able to see that any had passed the first moult. The first to change was *cybele*, which now appeared in a coat of smoky brown, covered with long fleshy spines, from which sprung many short black bristles. These spines were of the general appearance shown in the several successive moults. In all there were five moults to each of these species, and until the fourth they maintained their close resemblance to one another, so that had one from either lot escaped to another, I could not have separated them. They were cylindrical, thick, furnished with six rows of stout black spines, from the ends and sides of which sprung stiff bristles. The color of the body was silky brown or black, and at bases of part of the spines were yellow or fulvous spots. The heads were bilobed, brown or black, much tubercled,

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with conical vertices, and the back of the head was yellow or fulvous; the spines of the second segment were rather longer than the rest and projected forward horizontally over the head. After the fourth moult there were some differences. *Cybele* became larger than *aphrodite*, though not varying much in other respects, the one measuring at maturity about two inches in length, and the other about one and a half inches. But *diana*, which was also large, like *cybele*, at the fourth moult, displayed spines of immense size, nearly twice the length of those of the other two species. These radiated from the central axis of the body, like spokes from the hub of a wheel, the lower lateral row drooping so that the ends were on the level of the feet. The spines of the second segment, four in all, two dorsal and two lateral, were a formidable protection to the head. It was a superb creature.

The mortality had been so great among all these larvae that at last, as they approached maturity, they were reduced to but three or four of *cybele*, two of *aphrodite*, and one of *diana*, and how to preserve these was a matter of much anxiety. I arranged a keg with a high gauze bag over the top of it, which bag was confined by the upper hoop, and in the keg were planted violets every two or three days, as the leaves were consumed. This plan seemed to answer well, affording plenty of air, and I regretted that I had not tried it sooner. The larvae were fond of resting high up the sides of the bag, or on elevated sticks under it, coming down when impelled by hunger. After remaining motionless for hours, they would suddenly arouse themselves and start off in extreme haste, wandering all round the enclosure, and when leaves were reached, would eat ravenously and then climb up to rest again. I sometimes found them extended on the earth, and no doubt they appreciated the coolness and dampness of it.

Only three *cybele* went into chrysalis. They spun buttons of white silk and soon hung suspended, nearly straight, the anterior segments but little bent, and so continued about two days, when the change to chrysalis occurred. The first change was on the 19th of May, and three months and ten days from the awaking from hybernation. The chrysalis yielded the imago in twenty-three or twenty-four days, and the whole period from the laying of the egg to the imago was just thirty-eight weeks. One *aphrodite* only fastened for chrysalis. This was on the 14th of May, and the change occurred on the 15th, an interval of about thirty-six hours Unfortunately this insect died in chrysalis.

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Diana fixed on the 17th, and became a chrysalis on the 19th, the interval being about fifty-four hours. This yielded a butterfly on the 9th of June, after twenty to twenty-one days. The chrysalids of the three bore a strong likeness to each other, being all of the same general shape, and I may say in brief that they would be tolerably represented by the figure of the chrysalis of *A. aglaia*, in Humphrey's British Butterflies, although much larger than that figure. The length of *cybele* and *diana* was rather over one inch; *aphrodite* was as long, but more slender than the others, and it, as well as *diana*, was prettily streaked and variegated in brown and red; *cybele* was plain brown, and in one case yellow brown, with little ornamentation. By Miss Peart's assistance I was able to obtain a complete series of drawings from egg to chrysalis of each species, and of the several moults of each, and I propose to introduce these figures in course of Vol. 2, Butterflies of N. A.

Cybele was flying this year at Coalburgh, on the 1st of June, and these early examples must have come from larvae that began to feed after hybernation in March, as the food plant then would first appear above ground, so that the larval period after hybernation, when in the natural state, would be two months shorter than in the cases related above.

With regard to the food plant, I used every species of wild violet accessible from the woods, and during the winter cultivated species, and discovered no preference for one more than another. The wild violets were in flower part of the time, and the flowers were eaten by the caterpillars with avidity. The contrast between the habits of these larvae and those of other genera not far separated from them, according to the received arrangement, is something remarkable—as *Grapta*, for instance. One is in the preparatory stages nine months in the year, is impatient of confinement, extremely tender and raised only by the greatest care; the other is hardy, indifferent to confinement, and completes its cycle in about thirty days, from the laying of the egg to the appearance of the butterfly; one is single brooded, the other many brooded, at Coalburgh there being three or four. The number is probably dependant in any latitude upon the length of the season.

There are one or two points in the life history of the larger Argynnides that are not yet clear. With us, *cybele* ♂ is on the wing from the 25th of May to the 10th of June, as I have noticed for several successive years. Probably *aphrodite* nearly as soon, and *diana* first appears about the 20th of June. Shortly after the 1st of June the ♀ of

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cybele is to be seen, and both sexes abound in the clover fields. By the end of June *cybele* has become scarce, and the individuals to be seen have lost their freshness and are broken and worn. It is certain that these early appearing females have not matured eggs and laid them, because at no time from June to August will anything but rudimentary eggs be found by dissecting, and the eggs do not become distinguishable to the eye until August. They then mature rapidly, and in a few days attain full size. I am confident that no eggs are laid till August. But about the first of that month and all along to near the end of it, there appear in great numbers both fresh males and females, as if just from chrysalis, with no abrasion of the hairs on thorax between the wings, which spot is the first to show wear. (I doubt if an *Argynnis* could fly two days without thus giving evidence of it.) There are flying at the same time many worn individuals, especially females. These last are the first to deposit their eggs, but shortly after, and up to the time of frosts, the others also are in condition to do the same. I see no explanation of the appearance of these freshly emerged butterflies than that they have formed part of the brood of caterpillars hatched the previous fall, some of which brood yielded the butterflies that came out in May and June, and the remainder continued in the larval or chrysalis state until August, and upon these last the perpetuation of the species largely depends, for nine-tenths of the June flight must have been destroyed long before August. If I am right, the preparatory stages of the August *cybele* must consume eleven months out of the twelve.

CATOCALA WHITNEYI, *N. sp.*

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Expands 1 ½ inches. Primaries light gray, the outer third brownish, with a triangular gray spot near the apex. A narrow black line near the base of the wing extends from the costa to the submedian vein. Parallel to this and farther out, a black patch, narrowest at the costa and broadest on the second median veinlet, extends nearly across the wing, ending at the submedian vein. A triangular black patch surrounds the brownish reniform spot, and immediately back of this a curved black line reaches from the sub-dorsal vein to the second median veinlet. The secondaries

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are yellow. The black median band is curved, constricted in the middle and ends abruptly at the submedian vein. The marginal band is broadest at the apex, is sometimes broken opposite the termination of the median band, and extends but little beyond the submedian vein. There is a small yellow apical spot. Fringe on fore wings brown; on hind wings whitish, partly brown at base.

Beneath the prevailing color is yellow, being lighter outwardly. The median band of the posteriors is narrower than above, and prolonged by scattered black scales toward the anal angle. The marginal band is unbroken. Lunule black. Thorax and collar light gray. About one-third or less of the specimens taken are brown instead of gray. The median band also varies in width.

I name this species in honor of Mr. C. P. Whitney, of Milford, New Hampshire. My specimens were taken at Ohio, Ill., but it also occurs here. It is the only Catocala that I have ever seen attracted by flowers.

THE FOOD-PLANTS OF EUROPEAN BUTTERFLIES.

Second Notice.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

The third and concluding part of Kaltenbach's work *(Die Pflanzenfeinde aus der Classe der Insecten)*, has just been received in this country, and contains the following notices of the food plants of European butterflies, in addition to those previously given.* The numbers in parentheses refer to the former list.

1. *Melanargia galathea*—Phleum pratense.
2. *Erebia medusa*—Panicum, Setaria.
3. " *æthiops*—Dactylis.
4. " *ligea*—Milium effusum.
5. *Satyrus hermione*—Holcus lanatus.

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* See CANADIAN ENTOMOLOGIST, vi, 21-25.

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6. *Satyrus circe*—Lolium, Bromus, Anthoxanthum.
7. " *briseis*—Sesleria and other grasses.
8. " *semele*—Several species of Aira.
9. " *dryas*—Avena elatior.
10. *Pararge mæra*—Poa annua, Glyceria fluitans, Hordeum murinum, Festuca.
11. " *megæra*—Triticum and other grasses.
12. " *ægeria*—Triticum repens.
13. " *achine*—Lolium teriueleutum, Carex.
14. *Epinephele janira*—Poa annua and other grasses.
15. " *ida*—Triticum cespitosum.
16. " *tithonus*—Poa annua.
17. " *hyperantus*—Milium effusum, Poa annua, P. pratensis.
18. *Coenonympha hero*—Elymus Europæus and other grasses.
19. " *iphis*—Brachypodium sylvaticum, Cynosurus and other grasses.
20. " *arcania*—Melica nutans.
21. " *corvinna*—Triticum cespitosum, Carex gynomane.
22. " *pamphilus*—Poa, Anthoxanthum.
23. " *tiphon*—Festuca elatior.
24. (12). *Vanessa L. album*—Hippophae rhamnoides, Gooseberry, Birch, Purple willow.
25. (15). " *antiopa*—Salix capræa.
26. (32). *Melitæa maturna*—Fagus sylvatica, Scabiosa.
27. (34). " *cinxia*—Aira canescens.
28. (46). *Thecla W. album*—Prunus spinosa.
29. (47). " *ilicis*—Quercus.
30. " *quercus*—Quercus.
31. (59). *Lycæna icarus*—Medicago minima.
32. (67). " *semiargus*—Anthyllis vulneraria.
33. (86). *Pieris daplidice*—Diplotaxis tenuifolia.
34. (87). *Aporia cratægi*—Quercus.
35. *Thais polyxena*—Quercus ilex.
36. (97). *Syrichtus malvæ*—Fragraria vesca, Agrimonia eupatoria.
37. *Hesperia thaumas*—Aira montana, Festuca, Phleum.
38. " *lineola*—Arrhenatherum avenacium.
39. (100). *Hesperia sylvanus*—Avena pratensis, Holcus lanatus, Festuca.

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MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 97.)

COLEOPHORA.

[Antennae and palpi both simple.]

C. zelleriella. N. sp.

Slate color, tinged with ochreous; apex of the abdomen yellowish; two longitudinal dusky lines on top of the abdomen, which, however, are invisible in the dead specimen. *Al. ex.* $\frac{15}{16}$ inch. Kentucky.

The case is ochreous, slender, cylindrical, tapering a little to each end, and compressed or pinched at the posterior end, so as to divide it into three small ridges. It is about half an inch long, and was found adhering to the bark of sugar trees *(Acer saccharinum.)*

C. argenti-albella. N. sp.

Silvery white; some parts of the legs and under surface tinged with yellowish. *Al. ex.* $\frac{15}{16}$ inch. Kentucky. Larva and food plant unknown. The long, slender case was found adhering to the bark of beech trees *(Fagus Americana).*

C. gigantella. N. sp.

White, with seven longitudinal streaks upon the primaries, golden or ochreous yellow according to the light; one extends from the base just within the costal margin to the beginning of the ciliae. Two other parallel and oblique ones from the base near the costa to the dorsal margin near the apex; these are in the apical part of the wing, between the costal one and the first oblique one, and the seventh is within the fold, extending from the base to the dorsal ciliae.

Al. ex. $\frac{5}{8}$ inch. Collection of Mr. Wm. Saunders, London, Ont.

C. aeneusella. N. sp.

Greenish bronzy; posterior wings pale fuscous. *Al. ex.* 5 lines. Kentucky.

This species belongs to the section constituting Stephens' genus *Metallosetia.*

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[Antennae simple, second joint of palpi tufted at the apex.]

C. fagi-costicella. N. sp.

Yellowish white; a pale ochreous yellow streak from the base along the middle of the wing to near the end of the disc, where it becomes furcate and passes on into pale ochreous yellow of the apex; dorsal margin pale ochreous yellow, and a pale ochreous yellow streak just within the costal margin. *Al. ex.* ½ inch. Kentucky. The streaks are all obsolete or nearly so.

The larva and food plant are unknown, and I am perhaps wrong in naming the species for the *habitat* in which I have always found the pupa. I have found it so invariably upon the bark of beech trees as to make me suspect that the larva feeds on beech leaves, or on the moss and lichens which grow upon the bark. The larva case is almost cylindrical, tapering a little to each end, with a bent neck or tube at the anterior end, and compressed or pinched together at the other end, so as to be deeply concave on the upper surface; about the middle or just behind it its outer envelope is scalloped or serated so as to present three or four deep seratures or processes, looking as if the inside case had been inserted into the small bracts of a young leaf bud, from which the bud had first been removed.

C. unicolorella. N. sp.

Entire insect grayish drab, unicolorous. *Al. ex.* $\frac{4}{10}$ inch. Kentucky. Larva and food plant unknown.

This can not be *C. concolorella* Clem., which is yellowish ochreous without markings.

C. ciliæochrella. N. sp.

Silvery white, becoming gradually tinged with reddish ochreous to the apex of the primaries, the ciliae of which are distinctly reddish ochreous; antennae alternately annulate with white and brownish yellow. *Al. ex.* 5 lines. The tuft on the palpal joint is very small.

[Basal joint of the antennae with a small tuft; palpi simple.]

C. rufo-luteel'a. N. sp.

Head white; lower portion of the face tinged with yellowish; a spot on the vertex, and tuft of the basal joint of the antennae yellow; antennæ white, each joint annulate at its base with yellowish brown, and a few joints at the base entirely of that hue; thorax and anterior wings deep

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reddish orange, deeper, almost brown towards the apex; sides of the thorax and costal margin to the ciliæ white. *Al. ex.* nearly ½ inch. Kentucky. Captured in June.

[Basal half of the antennæ thickened with scales; palpi simple.]

C. auropurpuriella. N. sp.

Entire insect, according to the light, golden brown or golden purple with a greenish bronzy hue, especially towards the apex of the primaries, where the greenish tinge is very decided; apical half of the antennae annulate with silvery white. *Al. ex.* ⅝ inch. Coll. Mr. Wm. Saunders, London, Ont. (Belongs to *Metallosetia*, Steph.)

[Basal joint of the antennae thickened with scales; palpi tufted.]

C. lineapulvella. N. sp.

White, faintly tinged with ochreous yellow; dorsal margin and apex of the primaries more distinctly yellowish; two rather indistinct ochreous yellow lines begin before the middle of the wing and pass back, one to the apex and one to the dorsal margin before the apex, the apical line giving off a faint branch to the costal margin. Ciliae pale ochreous; the entire wing, except near the base, dusted with dark brown specks, which are arranged in lines more or less parallel to each other; antennae annulate with ochreous yellow. *Al. ex.* 5 lines. Kentucky. Taken at the lamp.

I have taken on the wing many other species, but I refrain from describing them until their food plants are known, a plan which I had perhaps also better have adopted with some of the above, for many of the species of this genus resemble each other so closely that it is well nigh impossible to give written descriptions by which they can be identified.

Signs Used to Denote Sex.—I have often been puzzled to account for the origin of the signs in use among naturalists to denote the male (♂) and the female (♀) sexes; but the other day, while reading an astronomical paper, I came across a fact which seems to offer a solution of the difficulty. It appears that the first sign (♂) has been used from remote antiquity to signify the planet Mars, and is a rude representation of a spear behind a shield, fit emblems of the God of War. Ceres, the goddess of corn, was similarly symbolized by the sign used in zoology to denote the female sex, with this slight difference, that in the original astronomical sign, the continuity of the circle is broken on the left side, so that the figure appropriately represents a sickle.—*E. C. Lefroy in Hardwicke's Science Gossip.*

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ON TWO SPECIES OF AGROTIS, ALLIED TO A. TRIANGULUM.

BY AUG. R. GROTE,

Curator of Articulata, Buffalo Soc. of Natural Sciences.

Among the material submitted to me for determination by Professor Packard, from the Peabody Academy of Science, are specimens from Maine and Massachusetts of two species of *Agrotis* allied to, but distinct from *A. triangulum.*

Agrotis attentus. N. sp.

The eyes are naked. The middle and hind tibiae are armed, but the fore tibiae are without spines; male antennae simple, bristled and pubescent. Fore wings pulverulent brown, paler over the costal region, on which the inception of the geminate lines are marked in dark brown. There is a narrow deep brown basal ray extending to the dentate indistinct t. a. line. Disc not suffused with darker brown between the ordinary spots, which are moderate, pale, with fine dark annuli. Orbicular *spherical*, complete, not pointed inferiorly, as in *triangulum.* T. p. line with its pale centre alone perceivable, denticulated, notched opposite the cell. The subterminal space is not differentiated by any darker tint; the subterminal line is pale, preceded at costa by a very slightly darker brown shade, not always noticeable, and not at all like the determinate mark of *triangulum.* Male hind wings almost whitish; female darker. Thorax and head like fore wings. Beneath the fore wings are brown, with the exterior line indicated; hind wings with brown costal region, else pale, with faint discal spot and a double subterminal line marked on the costal region. Maine; two specimens; expanse, 36 m. m.

Agrotis perattentus. N. sp.

Eyes naked; fore tibiae unarmed, middle and hind tibiae spinose; male antennae simple, bristled and pubescent. Color of *A. attentus*, but brighter, rosy brown and more like *triangulum*, on account of the discal field before the orbicular and between the spots being suffused with dark brown shading. Orbicular spherical, pale; claviform indicated in outline; a deep brown shading accompanies the basal dash. Reniform large and wider than in *triangulum.* Ordinary lines distinct, geminate, dark brown; t. p. line with its inner line distinct, lunulate; its outer line lost

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against the darker brown subterminal space, which is differentiated by its deeper color and which it inwardly limits. Subterminal line indicated by the difference in color between the subterminal and terminal spaces, the latter concolorous with the rest of the wing. Hind wings pale testaceous fuscous in ♂, more fuscous in ♀. Beneath a common fuscous line and dots; the tint is testaceous, with fuscous powdering; fore wings the darker, with ruddy costal edge. Mass.; Me.; expanse, 32 to 36 m. m.

Both these species are slighter bodied than the European *A. triangulum*, and differ in ornamentation by the shape of the ordinary spots, the conformation of the t. p. line, and the pallor of the hind wings.

Mamestra renigera (Steph.)

This species, referred in my "List" to *Hadena* (p. 16), belongs to *Mamestra*, and should be interpolated on page 13 l. c., between *M cinnabarina* and *M. laudabilis*.

NOTES ON THE LARVA OF LEUCANIA PSEUDARGYRIA, GUENEE.

BY F. B. CAULFIELD, MONTREAL, P. Q.

On April 18th of this season, while searching for insects on Montreal Mountain, I found under a stone at the foot of a hickory tree, a larva, of which the following is a description:

Length two inches. Form cylindrical, slightly annulated. Head reddish yellow, with two brown streaks, and marbled with lines and dots of the same color; semi-transparent, shiny, slightly bilobed, with a few scattered hairs of a whitish brown color. Mandibles brown.

Body above dirty greenish grey, with darker spots and blotches, a faint white dorsal line, and another of the same color a little above the spiracles; sides light greenish grey, minutely spotted with brown, with a few scattered hairs of a brown color, tipped with yellowish white. Under-surface, feet and prolegs very light greenish grey.

I placed this larva in a box with some earth, but owing to the backwardness of the season I could not find any food for it. It went under the earth on April 21st, and turned to a chrysalis on April 23rd. The imago emerged on May 20th, and proved to be *Leucania pseudargyria*, Guen.

That this larva hybernated there can be no doubt, and I believe, as a rule, that those larvæ which lie dormant during the winter, when spring

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comes, feed again for a short time before changing to chrysalis, but this instance proves that food is not always necessary to them after they have hybernated, as there was not even a bud to be seen when I found it. Of course under its natural conditions it would have partaken of some food as soon as vegetation appeared, otherwise it would have pupated in the autumn. This deviation from the usual habit may be attributed to its changed conditions, the warmth of the house hastening its transformations.

FIRST ANNUAL REPORT OF THE COUNCIL OF THE MONTREAL BRANCH OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

During the summer of 1873 a fortunate circumstance occurred to which this Branch owes its origin. The following gentlemen, viz., Wm. Couper, F. B. Caulfield, Wm. Hibbins, C. W. Pearson and G. B. Pearson, met by chance on the Montreal Mountain, where the subject was discussed, and it was then decided to hold a meeting at the residence of Mr. Caulfield, in order to make further arrangements for its formation. This meeting was held on the 30th of August, when it was resolved to form a branch in connection with the Entomological Society of Ontario, and the Secretary *pro. tem.* was instructed to write to the parent society, asking permission to form a Branch Society in this city. This proposition was at once accepted by the parent Society.

On the 16th of October the following officers were elected for the ensuing year:—William Couper, President; M. Kollmar, Vice-President; F. B. Caulfield, Secretary-Treasurer; Council—G. J. Bowles, P. Knetzing and C. W. Pearson; Curator, William Hibbins.

By-Laws were framed for the guidance of the Branch, which were approved by the parent Society. Our monthly meetings have been regularly held and well attended, and your Council congratulate the Society on the benefits derived. During the eight meetings which have been held, independent of the production of original communications on Entomology, there were remarkably good exhibitions of insects, which also tended to give additional information to members.

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The first meeting of the Branch in August, 1873, consisted of seven members, and since then five additional members have been elected.

The following papers were read during the winter months :

"A Dissertation on Northern Butterflies," by William Couper; "On the Cicindelidae Occurring on the Island of Montreal," by F. B. Caulfield; "On Some of the Benefits Derived from Insects," by F. B. Caulfield.

The following works have been donated during the year :

"On Some Remarkable Forms of Animal Life from the Great Deeps of the Norwegian Coast," by G. O. Sars, 1 vol.; "On Norwegian Crustaceans," by G. O. Sars, 2 vols.; "Synopsis of the Acrididae of North America," by Cyrus Thomas, 1 vol.

Your Council would suggest that the Curator procure store boxes for the preservation of the specimens obtained for the Society during the approaching season. In this way the nucleus of a collection can be formed prior to the purchase of a cabinet, which your Council trusts the Society will be possessed of before next winter.

Your Council would also suggest that members carry note-books wherein to record Entomological observations, especially relative to insects injurious to the crops; also of such species as are considered beneficial in checking the progress of destructive insects. As this is one of the principal objects of the Society, field notes of this nature are always valuable, and should form subjects of investigation and discussion at our meetings. Attention should be given to the larval forms of insects, as this is a specialty of Entomology from which much knowledge is yet to be obtained.

Your Council strongly impress on the members to use their influence in promoting a knowledge of the importance of the study of Entomology, more especially with agriculturists and horticulturists, in order to enable them to check the ravages of the numerous insects injurious to vegetation.

All of which is respectfully submitted.

WM. COUPER,
Chairman.

C. W. PEARSON,
GEO. JNO. BOWLES.

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NOTES ON THE SPECIES OF OODII OF LOUISIANA.

BY S. V. SUMMERS, M. D., NEW ORLEANS, LA.

The species belonging to this sub-tribe, although small in number, rank with the rarer forms of Carabidæ ; they may easily he known by their glabrous body and the confluent eighth and ninth striæ of the elytra. Several of the Oodii bear a superficial resemblance to certain *Amara* allied to *fallax*. With one exception *(O. elegans)* the species are all Atlantic, occurring more abnndantly southward. *Oodes fluvialis* must be considered a typical northern species, occurring rarely near St. Louis, Mo., but more abundant at Rock Island, Ill. *O. elegans* has occurred with Dr. Le Conte along the Gila River, in Arizona. We may expect additional species from the Southern Pacific region and the western source of the Rio Grande.

Lachnocrepis parallelus (Say).

A single ♂ specimen taken in November, under a partially submerged log on the Jackson R. R., near New Orleans. Dr. Horn gives the length 0.42 inch (Trans. Am. Ent. Soc., v. 3, p. 106); my specimen measures 0.44 inch long. Color black, somewhat shiny ; basal angles of thorax reddish brown. I have not been able to find this species in any of the New Orleans collections. I have seen one in Mr. Trabrandt's cabinet, from Mexico, near the Rio Grande.

Anatrichis minuta (Dej.)

Our smallest Oodii ; length, 0.20–0.25 inch. Rather rare. Specimens taken adhering to under surface of logs near streams, and on sifting mud from roots of plants over water. This species seems not to have occurred in Louisiana collections before last winter.

Oodes amaroides (Dej.)

Length, 0.34-0.40 inch. More than twenty specimens taken in galleries under logs, in very damp or muddy places. The species of the sub-genus *Oodes* (Chaudoir), have the ability to remain under water for nearly an hour at a time, and are seldom found running on the ground.

Oodes Americanus (Dej.)

Length, 0.58 inch. A single ♂ taken under a rail on the Ponchartrain R. R. Several others occur with Mr. Trabrandt. Our largest and rarest

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species; none of my *fluvialis* measure over 0.52 inch. Dr. Horn gives this and the preceding species as 0.50 inch long *(ante.)*

Oodes cupræus (Chaud.)

Several specimens taken by Mr. Trabrandt. I have found this species pretty common near St. Louis, Mo., on baling water over mud flats. They take flight very readily, and may be found running on the ground on warm days, but I have never been able to find them or *Lecontei* remain under water longer than most Carabidæ. The La. specimen before me is greatly mutilated, and I am reluctant to give its measurement. The Missouri species give 0.40 inch long.

Oodes Lecontei (Chaud.)

Length, ♂, 0.36 inch; ♀, 0.40 inch. Not rare. Many specimens taken under logs near water on bailing near the shore; also running on the ground in July and August. It is a more robust species than *cupraeus*, less shining and with punctured striæ. A single specimen taken somewhere on the coast of Miss., during the stoppage of steamer to "wood up," in June.

Oodes 14-striatus (Chaud.)

Length, 0.42--0.47 inch. Common everywhere near N. O. during the summer; found under logs and running on the ground near water, and frequently under loose bark in the woods. The specimens have a decidedly greenish tinge when alive. They are not as active as the Oodes and Stenous groups. Mr. Trabrandt informs me that they do not occur abundantly every year. They are also found in Texas and Mexico.

Oodes texanus, Lec.

Length, 0.42 inch—♂. A single specimen taken by C. Trabrandt while collecting together, and given me as a *14-striatus*, from which it is at once distinguished by the punctured striæ. The specimen occurred under some rail-road ties on the Ponchartrain R. R., on high ground, not near water. Dilligent search has sinced failed to discover others.

Evolenes impressus, Lec.

Length, 0.37 inch—♀. A single specimen taken near New Orleans and given me by Mr. Em. Trochammur. This is the rarest Oodii occurring in La. Any enlargement on descriptions of species would seem out of place, but would refer all to Dr. Horn's admirable and complete synopsis in Trans. Am. Ent. Soc., Vol. 3, No. 2, 1870.

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Crinus scrophulariæ, Auct.

A unique of this European Curculio was taken on wood wharf, June 30th. There can be little doubt of the correctness of this determination. My specimen is 0.16 inch long (exclusive of rostrum). Body black. Rostrum shorter than thorax, slightly arcuate; antennæ inserted about two thirds from tip, piceous; club somewhat paler. Thorax much narrower than base of elytra, covered with dense prostrate yellowish hairs, and with an elevated transverse ridge at middle; elytra somewhat triangular, blackish, coarsely punctured and with four black longitudinal vittæ, dotted with whitish. A rather large, oblong, dense black spot, margined posteriorly with whitish hairs, placed on the suture, near the scutellum, and a similar but smaller spot at apex. Legs blackish, more or less speckled with whitish hairs.

ANTICOSTI COLEOPTERA.

COLLECTED ON THE ISLAND IN 1873, BY WM. COUPER, MONTREAL.

(As determined by J. L. Leconte, M. D.)

Notiophilus sibiricus, *Motsch.*
Carabus palustris, *Fischer.*
" lapilayi, *Laporte.*
Calathus ingratus, *Dej.*
" confusus, *Lec.*
Pterostichus coracinus, *Lec.*
" luczotii, *Lec.*
Harpalus pleuriticus, *Kirby.*
Boletobius pygmaeus, *Mann.*
Creophilus villosus, *Kirby.*
Anthobium dimidiatum, *Mels.*
Necrophorus vespilloides, *Herbst.*
" mortuorum (pygmaeus), *Kirby.*
Hydnobius substriatus, *Lec.*
Epuraea boreella, *Er.*
Omosita colon, *Er.*
Byrrhus americanus, *Lec.*
Heterocerus substriatus, *Kies.*
Aphodius fimetarius, *Ill.*
" ruricola, *Mels.*
" granarius, var. spretus, *Hald.*
Chrysobothris trinervia, *Lec.*
Elater mixtus, *Lec.*
Agriotes fucosus, *Lec.*
Limonius quercinus, *Dej.*
Sericosomus incongruus, *Lec.*
Corymbites resplendens, *Esch.*
" aeneicollis (Kendalli), *Kirby.*
" spinosus, *Lec.*
" aratus, *Lec.*
Eros coccinatus, *Say.*
Podabrus basillaris, *Say.*
" laevicollis, *Kirby.*
Telephorus fraxini, *Say.*
Dolichosoma foveicollis, *Kirby.*
Hadrobregmus foveatus, *Kirby.*
Spondylus upiformis, *Mann.*
Criocephalus agrestis, *Kirby.*
Pachyta monticola, *Rand.*
Acmaeops pratensis (strigilata.)
Leptura pedalis.
Donacia emarginata, *Kirby.*
Syneta tripla, *Say.*

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Pachybrachis atomarius, *Mels.*
Bromius vitis, *Fabr.*
Anaspis rufa, *Say.*
Hylobius pinicola, *Couper.*
Dryocaetus septentrionis, *Hbst.*
Dendroctonus rufipennis.
Amara, not determined.
Cyphon, indeterminate.
Graptodera, not named.
Ceutorhynchus, not determined.

ON SOME OF OUR COMMON INSECTS.

17.—*THE CURRANT GEOMETER OR MEASURING WORM —Ellopia (abraxis) ribearia*, Fitch.

BY THE EDITOR.

This insect is now becoming very abundant in most parts of Ontario, and is a very troublesome pest. Its peculiar mode of progression will enable one to readily distinguish it from the common Saw-fly caterpillar, for, having its feet placed at each extremity, it arches its body into a sort of loop at every step, and is hence popularly called a measuring worm or span worm.

Fig. 22 (after Riley) shows this caterpillar in various attitudes. At 2 it is represented hanging from a silken thread which it has the power of spinning at will, and by means of which it is enabled to lower itself suddenly from the bush when danger threatens, and remains suspended in mid air until it can safely return to its former position. When full grown, it measures an inch or a little more in length. Its head is of a medium size, white, bilobed with a large round black spot on the upper part of each lobe, a short black stripe across the front, a little above the mouth, with a small spot of the same color on each side of it; there are also a few short black hairs scattered over its surface; jaws black. The body above is whitish, with a number of black spots of different sizes on each ring or segment; there

Fig. 22.

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is a wide yellow stripe down the back, and another of the same character along each side, but somewhat broken. The under side is white, with a slight tinge of pink, and also spotted with black, with a wide yellow stripe down the middle. The feet are blackish; prolegs yellow, dotted with black.

When full grown, the larva descends to the earth and buries itself a little below the surface, where it is transformed into a dark brown chrysalis about half an inch long, and remains in this inactive state from two to three weeks.

The moth, see fig. 23 (after Riley), is of a pale yellowish color, with several dusky spots varying in size, form and distinctness in different specimens; sometimes they are so arranged as to form one or two irregular bands across the wings; when these latter are expanded they measure about 1¼ inches. Soon after the moths escape they pair and shortly the female deposits her eggs on the twigs and branches of the gooseberry and currant bushes, where it is said they remain unchanged until the following spring.

Fig. 23.

This insect is a native of America, and was formerly confined to the wild gooseberry and currant bushes, on which we still occasionally see them. The larvae are found in various stages of their growth, from the 1st to about the 20th of June, and will feed on the black currant as well as on the red and white currant and gooseberry. The moths begin to appear during the first days of July, and are very common for two or three weeks following.

Powdered hellebore mixed with water and used with a watering pot, or Paris green mixed with twenty times its weight of flour and dusted on the bushes, will be found effectual remedies for the destruction of this caterpillar. The habit it has of letting itself down from the bush with a silken thread, and remaining suspended, may also be turned to practical account in its capture, for if, after tapping the infested bushes, a forked stick or some similar instrument is passed under it, all the hanging threads may be caught and the larvae drawn out in groups and crushed with the foot.

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EDITORIAL SUMMARY.

We have been kindly favored with a copy of the "Sixth Annual Report on the Noxious, Beneficial and Other Insects of the State of Missouri," by C. V. Riley, State Entomologist, 8vo., pp. 160, with 55 illustrations. Both entomologists and agriculturists are laid under lasting obligations to Mr. Riley for these excellent yearly reports on the life history and depredations of many of our insects. The present Report opens with "Notes of the Year," under which heading there are given some practical observations on the Codling Moth, the Colorado Potato Beetle and the Cotton Worm. Next follows a lengthy and exhaustive chapter of 56 pages on the Grape Phylloxera, in which is brought together in a consecutive form all the facts hitherto published in reference to this interesting insect. The Blue Caterpillars of the Vine then claim attention, each species being nicely illustrated. Detailed accounts are given also of Ham Beetles, the Clover Worm, the legged Maple Borer, the Raspberry Root Borer, the Northern Brenthian and the Jumping Sumach Beetle. A chapter on Beneficial Insects is next in order, in which the life history of a parasite on the common white grub is detailed. Then follow observations on the Dominican Case Bearer, the Yucca Moth, Hackberry Butterflies, closing with an interesting chapter on the Katydids. Mr. Riley seems admirably adapted to fill the position in which he has been placed, and we sincerely hope he may long be spared to prosecute the work he loves so well.

INTERESTING CAPTURES.—Mr. F. C. Lowe, of Dunnville, has recently been on a collecting tour in the county of Essex, and we have been favored with a sight of some of his captures. Among the more interesting insects secured, we would especially mention a very handsome and perfect specimen of *Papilio marcellus*, with the ground color an unusually fine pale green. Mr. Lowe saw three of these insects on the wing in the neighborhood of North Ridge, about four miles from Essex Centre, on the Canada Southern R. R, but only succeeded in capturing one of them. *Papilio thoas*—several taken. This insect was quite common in almost every clover field in that neighborhood. Mr. Lowe took two specimens of *thoas* last season on the River St. Clair, near Port Lambton. *Thyreus nessus* also common in clover fields; *Hesp. oileus*, several specimens; also the following, all captured between the 10th and 20th June: *Erebia nephele*, common; *Eudamus tityrus*, common; *Papilio turnus* and *P. troilus*; *Nisoniades catullus*, not rare; *M. tharos*, common; *P. Americana*, common; *Hesp. bathyllus*, rather plentiful; *Hesp. zabulon*, very common; *Nisoniades persius*, *Trichius bidens* and *Desmocerus palliatus*.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., AUGUST, 1874. No. 8

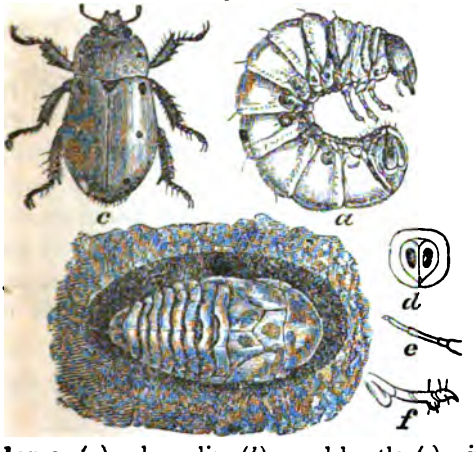
ON SOME OF OUR COMMON INSECTS.

18.—THE SPOTTED PELIDNOTA—Pelidnota punctata, Linn.

BY THE EDITOR.

This large and handsome beetle is an enemy to the grape vine. It attacks the foliage, eating numerous holes in the leaves, and sometimes when the beetles are abundant, completely riddling them. Damage from this cause to any great extent is however, fortunately of rare occurrence; in most instances the beetles are not numerous, but even where only occasionally met with, their size and beauty will always attract notice.

Fig. 24.



In the accompanying figure 24 (after Riley) this insect is shown in its three stages of larva (*a*), chrysalis (*b*), and beetle (*c*); it is in the latter state only that it is injurious to the vine.

The beetle measures about one inch in length, and half an inch in width at its widest part, is nearly oval in form and of a dull reddish yellow color, with a polished surface. The thorax, which is slightly darker than the wing covers, has a small black spot on each side, and there are three larger ones on each wing case. The jaws and posterior part of the head are both black; so also is the scutellum, which is a small, nearly triangular piece placed near the centre above, just where the two anterior edges of

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the wing cases join the thorax. The transparent gauzy wings, which are concealed when not in flight under the wing cases, are dark brown. The under side of the beetle is of a dark green shade, with a metallic lustre and downy about the middle, with fine brownish hairs; legs dark shining green.

It appears with us during July and August, and is moderately active during the day time, flying about from vine to vine with a heavy awkward flight and loud buzzing noise. After pairing, the female deposits her eggs in rotten wood, on which the grub, when hatched, feeds; the decaying stumps and exposed roots of different trees are usually selected for this purpose. Mr. Riley, of St. Louis, Mo., was the first to describe this larva, and we quote his description as given in the *American Entomologist*, vol. 2, p. 295:

"It is a large, clumsy grub, bearing a close resemblance to the common white grub of our meadows, and differs from that species principally in having the skin more polished and of a purer white color, and in the distinct heart-shaped swelling above the anus, fig. 24, *d*. Towards the latter part of June we have found this larva (fig. 24, *a*), in common with the pupa (*b*), in rotten stumps and roots of the pear. In preparing for the pupa state the larva forms a rather unsubstantial cocoon of its own excrement, mixed with the surrounding wood. The pupa state lasts but from eight to ten days, and the beetle (*c*) is found on our vines during the months of July, August and September. It is not yet known how long a time is required for the developement of the larva, but from analogy we may infer that the insect lives in that state upwards of three years."

In the figure, *e* shows the antenna of the larva, and *f* one of the legs —both magnified.

This insect in our Domtnion is confined mainly to the province of Ontario, and prevails most in the western section. We are not aware of its having been found at all in Quebec. It is common in most of the Western and Eastern States. Should it become sufficiently numerous in any section to excite alarm, it may readily be checked by hand picking; the insect being heavy and clumsy in its movements, may be easily captured and destroyed.

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THE LINNEAN SIGNIFICATION OF THE GENERIC TERM PAPILIO.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Perhaps no part of my "Systematic Revision of Some of the American Butterflies" has been more severely criticized than the restoration of the Linnean name Papilio to one of the nymphalideous butterflies, Antiopa. The principal objection made to this change, besides the fact that it runs counter to the current of modern usage, being that it violates the idea of the genus as it lay in the mind of its founder. The attention of those interested is called to the following historical facts, not given in the Revision.

The name Papilio was established by Linné in the first edition of his Systema Naturæ, in 1735*, where the following division occurs:

ANGIOPTERA.

Alae omnibus datæ, elytris destitutæ.

PAPILIO.	Rostrum spirale, alae 4.	Papilio alis erectis. Psyche alis planis. Phalaena alis compressis.

Here the typical Papiliones are the butterflies in general. The succeeding genera of Angioptera are *Libellula*, *Ephemera*, *Hemerobius*, *Panorpa*, *Raphidia*, *Apis*, *Ichneumon* and *Musca*.

In the second edition of the same work (1740) we find the following on p. 60:

153. PAPILIO. *Cauda simplex, alae* iv. *Rostrum spirale seu nullum.*

Pap. antennis clavatis, pedibus 4.
" " " 6, alis erectis angulatis.
" " " 6, " rotundatis.
" " " 6, alis patentibus.
" " " 6, alis reflexis.

Pap. ore spirale, antennis subulatis.
" " " barbatis.
" nullo, " subulatis.
" " " barbatis.

* I have only been able to consult Fee's reprint, Paris, 1830, p. 76.

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The butterflies with aborted front legs (*i. e.*, Nymphales) are here placed at the head of the series.

The third edition (1740) was but a reprint of the first, for German students.

The following arrangement occurs on p. 94 of the fourth edition (1744.):

160. PAPILIO. *Antennæ clavatæ.*

P. pedibus 4.
" 6, alis erectis angulatis.
" 6, " rotundatis. } le Papillon.
" 6, alis patentibus.
" 6, alis reflexis.

Here Papilio is still further restricted, always in the direction of the butterflies, and those with atrophied front legs are still at the head of the series.

In the year 1746 the first edition of the Fauna Suecica was published, in which Linné for the first time treats of species, giving to them names in the language of the country. The butterflies are found on pp. 232–248, and are divided into two groups, as follows:

[232.]* Pedibus quaternis unguiculatis.
[240.]** Pedibus sex unguiculatis.

The so-called tetrapods still at the summit. The species are numbered from 772 to 807; the species afterwards named *antiopa* is No. 772; that called *machaon*, No. 791.

In the fifth edition of the Systema Naturæ (1747), under Gymnaptera, p. 68, is an exact repetition of what is found in the second edition.

The sixth edition (1748) contains the following on p. 63:

185. PAPILIO. *Antennæ clavatæ.*

1. Papilio pedibus 4, alis erectis angulatis.
morio Fn. 772.
polychloros Fn. 773.
urticana Fn. 774.
C. duplex Fn. 775.
oculis pavonis Fn. 776.
ammiralis Fn. 777.
belladonna Fn. 778.

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2.	Papilio pedibus 4, alis erectis rotundatis.	imperator Fn. 779. comes Fn. 783.
3.	Papilio pedibus 6, alis erectis angulatis.	regina Fn. 791. canicularis Fn. 795.
4.	Papilio pedibus 6, alis erectis rotundatis.	brassicaria Fn. 799. aurora Fn. 801. alpicola Fn. 802. argus Fn. 803–806. butyracea Fn. 807, 808.

Here not only are the four-footed butterflies placed first, but, as in the Fauna Suecica, "*morio*" *(i. e., antiopa)* heads the list, followed directly by the butterflies most closely allied to it—*polychloros*, *urticæ*, *c-album*, *io*, *atalanta* and *cardui*, in the same order as they occur in the Fauna Suecica, to which the numbers on the right refer.

In the seventh edition (1748), exactly the same is found on p. 63.

The eighth edition contains no animals.

In the ninth edition (1756) we find precisely the same as in the sixth excepting in the first line, which reads, p. 69 :

196. PAPILIO. *Antennæ clavatæ.* le Papillon.

Not until the tenth edition (1758) of his great work, did Linné place the "swallow-tails" at the head of the genus Papilio, in the order too well known to require repetition here. In view of these facts, it is worth enquiring: In Linné's mind, which was a *typical* Papilio—Antiopa or Machaon? and was there, or was there not, any reason for specially selecting Antiopa as the type of Papilio, when it was found, in 1872, that by Schrank's first limitation of the genus, in 1801, it must be applied to some one of the Nymphales?

ENTOMOLOGICAL NOTES.

BY W. V. ANDREWS, NEW YORK.

Mr. J. E. Fletcher has a note in the March No. of *Newman's Entomologist*, on "Controlling Sex in Lepidoptera." He says: "During last summer, I had a few larvæ of *Exapate congelatella* feeding on privet; as I was greatly occupied with other things, they were neglected; the supply

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of food was very irregularly given and short in quantity, yet the moths produced from them consisted of four males, full sized, and eleven females, some of these latter being much below the average of the species in size."

I presume that the reason Mr. Fletcher supposed that the resnlt may have been very different was because he had read in "Newman" the result of an experiment performed by an American lady, I think Mrs. Treat, who, having underfed a lot of larvæ, succeeded in producing all males, the inference drawn being that males were simply underfed females. I wrote some notes on this subject for "Newman," thinking that Mrs. Treat's paper had appeared originally in that publication. It seems, however, that it did not, and I now reproduce the substance of those notes here, as more likely to meet the eyes of all concerned.

First, then, I would remark that this clearly is not Nature's method of "controlling sex." If a batch of larvæ, say of *V. antiopa*, all feed on the same elm, there will be produced both males and females, although the feeding must be alike for all. But there is an excellent opportunity afforded Mrs. Treat of testing the value of her theory, by the larva of *Thyreus Abbottii* (Swains.) It is well known that the male larva of this species is altogether different in color from that of the female, so the sexes are easily distinguished.

Now, if Mrs. Treat will take the female larvæ, and by underfeeding it *produce male imagines*, the thing will be more satisfactory. I am not unaware that in Hymenoptera food is said to have a good deal to do with the production of sex, but still Mrs. Treat's experiment cannot be considered as conclusive.

Hasty generalization is a fault to which we are very liable, and doubtless the ambition to discover a new law is very laudable. A case of this nature occurs in your No. 5, vol. 6. In a paper appearing in that number, Mr. Gentry, of Germantown, fancies he has discovered the law which produces difference of color in caterpillars of the same species. Now, to be of any value, this law must be universal, and the facts of the case do not show any such universality. Mr. Gentry thinks that the difference in color and markings where this occurs is attributable to the difference in the chemical constituents of the food plant at different seasons of the year. He selects as one instance the larva of *Eacles imperialis*, and gives, correctly enough, three varieties of color. But, unfortunately, these varieties occur at one part of the season as well as at

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another, and the varieties may be found feeding on the same tree. How, then, can the food have anything to do with the variation? *Eacles imperialis* is single brooded with us, but still the larva is found in August as well as in October, and no difference in color is observable at one time more than another. In a previous number I related an experiment made with a brood of *imperialis*, and, in that case, every one of the larvae were dark.

The chemistry of biology is doubtless a very abstruse subject, but it is well worth any labor that may be bestowed on its investigation. The larva of *A. luna* feeding, say, on Sweet Gum, produces an insect of a beautiful green color. That of *Eacles imperialis*, feeding on the same food, produces an insect of which yellow and purple are the predominant colors, while that of *regalis* produces an imago yellow and red. Here are larvae all similarly constituted as regards masticatory and digestive powers, and the substance acted upon is the same in each case, and yet how different is the result. This is very wonderful. What is there in the constitution of the digestive organs of these respective larvae that enables one to eliminate this color, and another that? Of course similar results may be observed in other animals, and the same beefsteak may contribute to the growth of a negro as well as of a white man, but still this does not diminish the difficulty we have in understanding how it is done. Entomology is a fascinating pursuit, looked at as merely an amusement, but I have an abiding faith that it is destined to throw more light on the phenomena of life than perhaps any other branch of science can. But we must avoid hasty conclusions.

I have selected only one instance from Mr. Gentry's paper, but there are others. For example, the same objections may be made in the case of *Sphinx 5-maculata* as are made in that of *imperialis*. The different colors appear at the same season, and may be found feeding on the same tomato plant.

ON THE LARVA OF CATOCALA ULTRONIA, HUBN.

BY THE EDITOR.

For several years past, while jarring our plum trees for Curculio in June, we have taken the larva of a Catocala usually less than half grown, but have never succeeded in rearing any of them until this season, when

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from three larvæ taken on the 16th of June, one has been successfully brought through its various stages, and proves to be *ultronia.*

The following description was taken at the time of its capture, when it was nearly full grown.

Length 1-60 inches, onisciform.

Head medium sized, flattened in front, slightly bilobed, dull bluish grey, with the front flattened portion margined with a purplish-black stripe. Under a lens the surface appears thickly dotted with pale and dark colored dots and streaks, with a few short, pale, scattered hairs.

Body above dark dull grayish brown, appearing under a magnifying power thickly studded with brownish dots on a paler ground. Second segment a little paler than the others. A sub-dorsal row of dull reddish tubercles, one on each segment from second to fourth inclusive, but behind this there are two on each ring to the twelfth segment inclusive, the anterior one being the smallest, while the posterior and largest tubercle is more decidedly red, all encircled with a slight ring of black at their base. On the ninth segment above there is a prominent, nearly upright stout, fleshy horn, about one-twelfth of an inch long, pointed and similar in color to the body, but with an irregular grayish patch at each side. On the twelfth segment the two hinder tubercles are somewhat increased in size and united by a low ridge, tinted behind with deep reddish brown; there is also an oblique stripe of the same color extending forward from the base of the tubercles to near the spiracle on this segment. The terminal segment is flattened and has a number of small pale reddish and blackish tubercles scattered over its surface. In front of each of the smaller sub-dorsal tubercles, from fifth to twelfth segments inclusive, there is a dull white dot, and one also of a similar character in front of each of the spiracles along the middle segments of the body; from each of the tubercles throughout there arises a single dark short hair. Spiracles large, oval, dull grayish, faintly encircled with black. Along the sides of the body, close to the under surface, is a thick fringe of short, fleshy looking hairs of a delicate pink color.

The under surface is also of a delicate pink, of a deeper shade along the middle, becoming bluish towards the margins, with a central row of nearly round, velvetty black spots, which are largest from the seventh to the eleventh segments, inclusive. The anterior segments are greenish white, tinted with rosy pink along the middle, with a dull reddish spot at

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the base and behind each pair of feet. Feet pale greenish, spotted outside and tipped with black; prolegs dull greyish brown, margined with black.

This larva became a pupa on the 21st of June, and remained in this state for twenty-four days, producing the imago on the 15th of July.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 130.)

ASPIDISCA.

For the purpose of comparing it with the other species, I quote here Dr. Clemens' description of

A. splendoriferella.

"Head golden; antennæ fuscous, tinged with golden. Fore wings from the base to the middle leaden grey, with a splendant lustre, and from the middle to the tip golden, with a broad, nearly straight, metallic, silvery streak, extending from the costa, near the tip, to the middle of the wing, and dark margined on both sides. This is nearly joined by a dorsal streak of the same hue, almost opposite to it, with converging dark margins, and with a blotch of dark brown scales adjoining it behind. In the costo-apical cilia is a short, blackish brown streak, parallel to the dark margin of the silvery costal streak. At the tip is a black, apical spot, with metallic, silvery scales in its centre, and a few silvery scales in the ciliae above and beneath it. A blackish brown hinder marginal line in the ciliae, interrupted by a silvery streak in the ciliae beneath the apical spot, and the ciliae yellowish brown. Hind wings leaden gray, and the ciliae yellowish brown."

There is a straight black streak in the ciliae, from the apical spot to the apex, not mentioned by Dr. Clemens.

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Alar ex. 2 lines or less. I have made some other observations on it in its various stages, vol. 3, ante p. 223. As there stated, it mines the leaves not only of the Apple, in which Dr. Clemens found it, but also those of the Haw *(Cratægus)*, Pear *(Pyrus)*, Wild Cherry *(Prunus serotina)*, and since then I have found it mining the leaves of the Quince *(Cydonia)*. All of these trees (except, perhaps, the Wild Cherry) are so nearly related that it is not surprising to find in the leaves of any one of them any larva which mines the leaves of another, and the Wild Cherry is such a favorite food with the larvæ of Lepidoptera, that it is not surprising to find any larva feeding on it which is not exclusively attached to some single species. Thus an *Ornix*, which mines Apple leaves, also mines those of the Wild Cherry. *Tischeria malifoliella* Clem., and *Lithocolletis cratægella* also both mine the leaves of all the above named trees except, *perhaps*, the Pear and the Quince. The fact that *A. splendoriferella* mines the leaves of the trees named, affords no presumption then that it is a general feeder, or that it mines the leaves of any tree not closely allied to the Haw.

I make these suggestions because Mr, Stainton, in the preface to his very valuable addition of the writings of Dr. Clemens (for publishing which he has the hearty thanks of every student of the American Micros), states that he has bred from Aspen leaves, from Oregon, a species which it would be very hard to distinguish from *A. splendoriferella*. But because of the difference in the food plants, Mr. Stainton (rightly, I think) considers it a different species. If the vignette upon the title page of Mr. Stainton's edition, above named, is, as I suppose, intended to represent the mined Aspen leaf, I think it establishes the specific character of the Aspen species. The hole left in the Aspen (judging from the vignette) is very nearly an ellipse. That made by *A. splendoriferella* is much wider in proportion to its length, being nearly as wide as long, and the case is almost angulated at the sides. The mines of the Micro-Lepidoptera, and the larval cases of the case-bearing species, and the modes of pupation, and forms and colors of their cocoons and pupa cases, have specific characters as distinct as the galls made by the *Cynipidæ*. The color of a pupa case, cut from a leaf, depends, for instance, not only on that of the leaf, but of the silk with which it is lined and the color of the enclosed larva and pupa. But I have never been able to detect a difference between the pupa cases of *A. splendoriferella* from any of the leaves mined by it, as above stated. See remarks under the next species.

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A. juglandiella. N. sp.

Except that it is *perhaps* a trifle smaller, I can not distinguish this species in the imago from *A. splendoriferella.* Nevertheless, I consider it a distinct species. The pupa case is oblong oval, much narrower in proportion to its length, and smaller in every way than that of *A. splendoriferella,* besides being more pointed at the end by which it is attached. Besides, although *splendoriferella* is much the most common species (at least 1000 mines of *splendoriferella* being found to a single one of *juglandiella*), yet I have never met with a mine of the former earlier than the latter part of July, whilst the mines of the latter are as abnndant, or nearly so, in the latter part of May as at any time. The first mines of *juglandiella* that I discovered were in the leaves of a small Walnut tree, which stands under a large Wild Cherry tree. It was early in June. I found several mines, but they were not by any means abundant. Not a mine could I find on the Wild Cherry, either at that time or for two months afterwards. *Juglandiella* continued to mine the leaves of the Walnut throughout the season, but never became abundant. But from the latter part of July, on through the season, the mines of *splendoriferella* were abundant, not only in the leaves of that particular Wild Cherry tree, but in those of all the species mined by it, and by October the leaves were riddled with the holes left by cutting out the cases. The pupa case of *splendoriferella* is much larger than that of *juglandiella,* though there is no appreciable difference in the size of the insects. The former is dark yellowish, while the latter is brown. I have taken the latter species mining Walnut leaves at a great distance from any Wild Cherry trees, as well as close to them. (See also the remarks under *A. splendoriferella.*)

A. saliciella. N. sp.

Silvery. Antennæ faintly tinged with fuscous. There is a triangular white costal spot before the ciliæ, and an opposite dorsal one, each dark margined before and behind; *the space between these two streaks and behind them to the apical spot is silvery.* There is a golden yellow patch on the end of the disc immediately before the space, between the two streaks above mentioned (the costal and dorsal white streaks). Another golden yellow patch behind the costal streak, on the margin, with a very indistinct and small black costal streak in it; another golden yellow patch on the dorsal margin, behind the dorsal streak, and behind it is a blackish patch covering the base of the dorsal cilia. Apical spot black, and adjoining it

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behind is a fan-shaped dark brown patch at the base of the apical cilia. Ciliæ silvery, *and not containing a black streak from the apical spot to the apex.*

The italics above indicate the differences between it and *A. splendoriferella*, and besides, it is much smaller than either that species or *A. ella*, having an *alar ex.* of less than ⅛ of an inch, and thus smaller than *Nepticula microtheriella*, which, Mr. Stainton says, is the smallest heretofore known Lepidopteron. Besides, the antennæ are not so distinctly fuscous as in *splendoriferella*, and the golden portions of the wing are not so deep or reddish golden as in that species. It resembles that species more closely than either *A. ella* or *A. lucifluella*. The pupa case is oblong ovate, brownish, not so much pointed at the anterior end as that of *A. juglandiella*, and is a little smaller.

Dr. Clemens found a mine and larva in the leaves of the White Willow *(Salix alba)*, which he called *A. saliciella*, but he was not acquainted with the imago. I have not met with that mine, my species having been bred from the Weeping Willow. But as I have no doubt that it is the same species, I have adopted his name.

A. ella. Ante v. 3, p. 224.

In the description of this species I have used the word "before" where I should have written "behind," as to the location of the costal streaks; and the whole description is so unsatisfactory that I wish to redescribe it. It is, however, difficult to get a good description of a species which does not present the same appearance in any two views of it.

Head, palpi, thorax and basal half of the primaries pale grayish silvery. Antennæ fuscous above, silvery beneath. Apical half of the primaries black along the *dorsal* margin, the black spreading over the middle of the apical portion of the wing to the golden yellow *costal* part of the apical half of the wing. This golden yellow costal portion extends along the entire costo-apical margin, and along the middle of the apical portion of the wing it passes gradually into, or blends with, the blackish dorsal portion. (Perhaps a more correct description would be: apical half of the wing golden along the costal half, blackish along the dorsal half, the two colors meeting and blending with each other in the middle, and the black passing into the base of the dorsal cilia.) In some lights the golden is strongly tinged with red, and the black becomes a deep golden brown. *In the black dorsal portion*, behind the middle of the dorsal margin, is a triangular silvery streak; and opposite to it, *in the*

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golden costal portion, is another, the two almost meeting so as to form a fascia, and both dark margined on both sides; behind the costal streak, at the end of the golden portion and before the apex, is another small costal silvery streak, which is distinctly dark margined before by a straight line, and faintly behind by an oblique one. Apical spot black, and behind and adjoining it is a fan-shaped, dark brown spot, behind which is a straight dark brown streak in the ciliæ, extending to the apex. The apical spot is margined before and on each side with brilliant, metallic, silvery scales, as in *splendoriferella*.

Al. ex. 2 lines or less. Same as in *splendoriferella*, but this species is slenderer than that. The first costal and the dorsal streaks are as in that species, but there is much less golden in the apical half of the wing, and much more blackish or dark brown. The apical spot aud adjoining fan-shaped patch and apical streak are as in *splendoriferella*, but in *splendoriferella* there is but one costal streak. It is, in fact, less like *splendoriferella* than any of the other species. The pupa case is nearly an ellipse, slightly oval, golden yellow, marked with small brown dots.

I was at first in doubt whether this might not be Clemens' *A. lucifluella*, which mines Hickory leaves. But I cannot reconcile it to the requirements of his description, which says that *lucifluella* is larger than *splendoriferella*, and has three costal streaks. I have met with the larva of *lucifluella*, but have not succeeded in raising it. Dr. Clemens met with another mine in the leaves of the Hornbean, which he called *A. astryaefoliella*, but the maker of the mine is still unknown. Possibly it may prove to be this species.

[Since the foregoing remarks were written, I have observed that the microscopic hairs (vegetable) on the surface of the case of *A. ella* are identical with those on the under surface of Hickory leaves, and this tends to the conclusion that this is Clemens' *lucifluella;* but other leaves may have similar hairs. The fact that I can not recognise it in Dr. Clemens' description is by no means conclusive, for my own first description is certainly defective, and the shades of coloring vary so with the play of the light, that it is a very difficult species to describe satisfactorily.]

ERRATA.—*Ante* p. 128, under *C. gigantella*, in line 5 of the description, for "these" read "three;" p. 129, for *fagi-costicella* read *fagi-corticella*.

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PRELIMINARY CATALOGUE OF THE NOCTUIDÆ OF CALIFORNIA.

BY AUG. R. GROTE,

Curator of Articulata, Buffalo Soc. of Natural Sciences.

1. *Bombycia improvisa* (Hy. Edw.,) Proc. Ac. N. S., Cal., 5, p. 189.

"Cascades, W. T." Unknown to me and perhaps incorrectly referred to this group.

2. *Pseudothyatira expultrix* Grote.

"Cariboo, B. C.," Hy. Edw., l. c. Unknown to me from the West Coast.

3. *Habrosyne scripta* (Gosse.)

"Alaska" (?) Hy. Edw., l. c. Sitka, No. 137, Hy. Edw.

4. *Acronycta lupini* Behr., Bull. Buff. Soc. N. S., 1, p. 79.

One specimen.

5. *Acronycta lepusculina* Guenee, Bull. Buff. Soc. N. S., 1, p. 130.

A fresh specimen sent by Mr. Behrens gives me some reason to doubt this determination and to suspect a distinct species, allied to *A. leporina* and *A. lepusculina*, in California. The fore wings are narrower, the markings more obliterate above. A different material from that now accessible to me is needed to make any change in this determination or to confirm it with positiveness.

6. *Acronycta perdita* Grote.

♂ Nearest resembling *A. xyliniformis* of any of our Eastern species, but larger, more robust, and with the fore wings even darker. There is an absence of any softer shadings before and behind the transverse posterior line. All the markings are coarser. The terminal series of black interspaceal marks are large and heavy. The transverse posterior line has the outer dentations more uneven; the teeth on veins 4 and 6 are notably longer; the line itself seems hardly so near the terminal margin as in *xyliniformis*. The black shade streak at anal angle is heavier and the dash on the median space is different in position, more incon-

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spicuous and near the t. a. line. The median shade is less prominent and the t. a. line more distinct and widely geminate. Hind wings white, like *xyliniformis*, but the fringe is merely black dotted, not cut with black as in the Eastern species. The palpi exceed the front more prominently than in *A. xyliniformis*. *Exp.* 40 m. m. "June 5th," Mr. Behrens.

7. *Feralia februalis* Grote. List of the Noct. of N. Am., p. 60.

"Sanzalito," Mr. Behrens, "February 12th."

8. *Agrotis saucia* (Hubner), Bull. Buff. Soc. N. S., 1, p. 135.

"Oakland," No. 15, Mr. Behrens.

9. *Agrotis fennica* (Tauscher.)

"Kodiak," No. 13, Mr. Behrens. A single ♂, which agrees with Herrich-Schaeffer's figure 146, except that the hind wings are very pale and whitish.

10. *Agrotis lycarum* Herrich-Sch., figs. 122–124.

No. 1392, Mr. Hy. Edwards; No. 31, Mr. Behrens. This species, which seems to be very common in California, I have determined with hesitation. I cannot discover, however, any difference of importance between Herrich-Schaeffer's figures, above cited, and the material before me.

11. *Agrotis Vancouverensis* Grote, Bull. Buff. Soc. N. S., 1, p. 134, plate 4, fig. 4.

"Vancouver's Island," No. 2624, Mr. Hy. Edwards.

12. *Agrotis formalis* Grote, List of the Noctuidæ of N. Am., p. 61.

California, Mr. Behrens.

13. *Agrotis Wilsoni* Grote, List of the Noct. of N. Am., p. 62.

California, Nos. 12 and 24, Mr. Behrens.

14. *Agrotis specialis* Grote, List of the Noct. of N. Am., p. 62.

California, Mr. Behrens.

15. *Agrotis fuscigerus* Grote.

♂ ♀. A species closely resembling *A. Cochrani*, but with notably darker and more fuscous hind wings in either sex. The primaries are

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much darker, more evenly colored, without that mottled appearance which has induced Mr. Riley's comparison of *Cochrani* with *chenopodii*. The lines are variably distinct; when present, the inner component line of the t. p. line is usually broad. The four specimens (♂ ♂ ♀ ♀) sent by Mr. Behrens under the No. 25, and as taken Sept. 13th and 14th, expand—♂ 30, ♀ 35 m. m., and cannot be referred to *Cochrani*.

16. Agrotis Hollemani Grote.

A small species with all the tibiæ spinose; the fore tibiæ have two rows of strong spines. Antennæ pubescent. Fore wings of a dark bluish grey, with hardly a trace of the usual lines. A strong black basal stripe; the cell shaded with black about the discal stigmata, which are singularly shaped, the orbicular elongate and fusing with the moderate, excavate reniform, so that we are reminded of *Oncocnemis Chandleri*. The terminal space is indicated by interspaceal black streaks. Fringes concolorous with internal hair line. Hind wings blackish fuscous, with whitish fringes divided by a hair line. Beneath whitish, powdered with fuscous, without lines; hind wings with a minute discal dot. Head and thorax like primaries; collar with a dark superior line. *Expanse*, 30 m. m. Siskiyou Co., Cal., Capt. Holleman. From Prof. A. S. Packard, jr.

17. Mamestra cuneata Grote, Bul. Buf. Soc. N. S., 1, p. 139, plate 4, fig. 9.

No. 21, Mr. Behrens. "Mendocino, No. 21. The dot near internal angle of fore wings is always yellow; in a few specimens, probably rubbed, it is not noticeable.

18. Mamestra chartaria Grote, Bul. Buf. Soc. N. S., 1, p. 138, plate 4, fig. 12.

California, Mr. Behrens.

19. Mamestra niveiguttata Grote, Bul. Buf. Soc. N. S., 1, p. 140, plate 4, fig. 16.

California, Mr. Hy. Edwards.

20. Mamestra puerilis Grote, List of the Noct. of N. Am., p. 64.

California, Mr. Hy. Edwards and Mr. Behrens.

21. Mamestra cinnabarina Grote, Proc. Bost. Soc. N. H., 16, p. 241.

California, Mr. Hy. Edwards and Mr. Behrens. Several specimens show a range of variation in the extent of the brown and palest tint on the primaries above.

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22. Mamestra laudabilis (Guen.)
California, Mr. Hy. Edwards.

23. Mamestra 4-lineata Grote, Bul. Buf. Soc. N. S., 1, p. 140, plate 4. fig. 15 and List, p. 13.
California, Mr. Hy. Edwards and Mr. Behrens.

24. Dianthœcia leucogramma Grote, List. p. 64.
California, Mr. Hy. Edwards and Mr. Behrens.

25. Dianthœcia rufula Grote, List of the Noct. of N. Am., p. 64.
California, Mr. Behrens. "Oakland, No. 22."

26. Dianthœcia insolens Grote, List of the Noct. of N. Am., p. 65.
California, Mr. Behrens.

27. Oncocnemis Behrensi Grote, List of the Noct. of N. Am., p. 65.
California, Mr. Behrens. "Sanzalito, Feb. 10th to 24th."

(To be Continued.)

CORRESPONDENCE.

GRAPTA COMMA AND DRYAS.

DEAR SIR,—

I am able to give you the results of an experiment made with *Grapta comma*, the converse of that made in 1873 with *dryas*. On the 10th of May last I took a female, true *comma*—red hind wings and plain brown underside—and tied it up to a branch of Hop-vine, which branch was free from eggs of any sort. She laid in the bag some forty eggs, and I had from them thirty-nine caterpillars. Most of them in due time reached the chrysalis state, and between the 10th and 15th of June there emerged thirty-four butterflies—every one a *dryas*. In the fall of 1873, from eggs of *dryas*, there resulted a large number of *comma* and six *dryas*, as stated in the ENTOMOLOGIST for October. I think this fully settles the question of the dimorphism of the species.

Yours truly,

W. H. EDWARDS, Coalburgh, W. Va.

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MISCELLANEOUS NOTES.

DEAR SIR,—

I send you the following items, hoping they may prove of interest:

CLISIOCAMPA SYLVATICA.—The caterpillars of this pest are swarming on almost every description of tree or shrub in the vicinity of this city, many trees being completely denuded of foliage. *C. Americana* is also common on apple trees.

LACHNOSTERNA QUERCINA. — This insect, though usually very abundant, has been quite scarce this season; I have not seen more than a dozen specimens.

DEPRAVED TASTE OF P. TURNUS.—One day early in June a *P. turnus* which I was pursuing hovered over and alighted upon some cow droppings, thrust out its tongue, and settled itself quietly to its disgusting repast. While in this position it was easily captured.

On the 27th of July, last year, it rained very heavily during the evening in the vicinity of Portland, where I was spending the summer; but the night seemed very favorable for moths, a large number entering the house, among them a fine specimen of *Philampelus satellitia*, two of *Arctia virgo*, and one of *Arctia rubricosa*, besides a number of others with the names of which I am not acquainted.

DESCRIPTION OF THE EGG OF GASTROPACHA AMERICANA.—The eggs of this moth are very pretty, being white with peculiar black markings. They were laid June 27th, by a female reared in confinement. Length .06 of an inch; width, .045. Form oval, flattened at the base and also above, but a little thicker at one end than at the other. At each end there is a semi-circular stripe and dot, closely resembling the crescent and star of the Turkish arms, and these markings are larger and more distinct on the larger end. On both the flattened surfaces there are markings like eyes, each formed by an oval spot in the centre, with a curved stripe above and a shorter straight one below, of which the latter is widened towards the extremities. Between and parallel to the two eye-brow-like marks there is another black stripe which is widest at the larger end of the egg, and tapers towards the other. Over the whole surface there is a minute indented reticulation, the meshes of which are irregular in form, with a depressed dot in the centre of each.

H. H. LYMAN, Montreal, P. Q.

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DEAR SIR,—

A few days ago I went to a swamp where *Phæton* feeds in early spring, and discovered several of the webs of that species spun over the stems of *Chelone glabra* and whatever other plants were contiguous. Within the webs were larvae about ¼ inch long, and as during the last few days, since I have had a number of them in the house, there is no appearance of feeding by the larvae, I presume they are quiet for the season and till next March. Seeing a good many *Phyciodes marcia* flying in the swamp, it occurred to me to try a female with a stem of *Chelone glabra*, and I did so with satisfactory results, as three days after I enclosed her in a bag, she laid about 75 eggs on the under side of one of the leaves. I hope I have at last found the food plant of this species, after having tried a score of plants to no purpose.

W. H. EDWARDS.

EDITORIAL SUMMARY.

PALÆONTOLOGY OF ONTARIO.—We are much pleased to observe that the Legislature of this Province is extending its liberality in the cause of Science to other departments, besides those somewhat utilitarian branches of Entomology and Horticulture, as is eminently manifest from the excellent Report before us on the Palæontology of Ontario. It has been prepared by Prof. H. Alleyne Nicholson, of the University of Toronto, and contains descriptions and figures of the organic remains of the Devonian Formation of Western Canada. No less than one hundred and sixty species of fossils are described, and illustrated by means of nearly sixty wood-cuts in the text, and eight splendid lithographic plates. It is noteworthy, also, that all the figures are original, except two of the wood cuts. We trust that the Legislature will long continue its assistance to this excellent work, and that Prof. Nicholson may be enabled to carry out a complete investigation of the Palæontology of all the fossiliferous geological formations in this country.

AMONG the "old country" publications that we have lately received, we may mention the 15th number of the *Scottish Naturalist* (Dr. F. B. White, Perth.) We gather from its pages that a goodly number of Field Clubs are being organized in Scotland, and that much satisfactory work

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is anticipated from them. Cannot something of the kind be re-inaugurated here with a fair promise of success?————*Nature* continues to be as well filled as ever with most interesting and instructive matter; recent numbers have contained seasonable articles upon the Comet and the Transit of Venus, and a series of illustrated papers upon the observatories of the United States.————European potato growers are beginning to become alarmed at the prospect of a speedy invasion of their fields by the devastating Colorado Beetle. As it has now very nearly reached the Atlantic seaboard, we have little doubt that in another year or two it will succeed in crossing the ocean and striking terror into the hearts of all patriotic Irishmen. Mr. Newman, in a recent number of his "Entomologist," while he confuses the sweet potato with the ordinary potato, and the insects that prey upon these very different plants, expresses his disbelief in the prospect of trouble from any of our American pests. He goes on, however, to quote all the remedies against the Colorado beetle contained in the Report of our Society—without acknowledgement!

WE REGRET to announce the death of Mr. Geo. R. Crotch, M. A.. of St. John's College, Cambridge, who sailed from England to America in 1872 for the purpose of studying the Entomology of parts which he considered incompletely known. He made collections, especially of Coleoptera, in California, Vancouver's Island, Oregon and other Districts. So much were his labors valued in England that his University on two occasions voted him a sum of money to aid him in the formation of collections for the Museum at Cambridge.

THE 23RD Meeting of the American Association is to take place this month at Hartford, Conn., beginning on August 12th. Dr. LeConte is the President elect. As an invitation was extended at the Portland meeting to the members of the Entomological Society of Canada to be present on this occasion, we trust that many of our friends will make a point of attending; there will no doubt be a large attendance of insect hunters from all parts of the continent.

THE 44TH Meeting of the British Association is to be held at Belfast, under the Presidency of Prof. Tyndall. It is to commence a week later than that at Hartford.

C. J. S. B.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., SEPTEMBER, 1874. No. 9

THE AMERICAN ASSOCIATION.

At the recent gathering of this scientific body, in Hartford, Conn., there were brought together an unusual number of Entomologists. This was owing partly, no doubt, to the kind invitation extended by the Association to the American and Canadian Entomological Societies, to appoint special meetings of their members to be held at that time and place, with the view of having these important Societies fully represented. In response to this invitation, a number of members of the American Entomological Society were present, while our Canadian Entomologists were represented by the worthy President of our Society, Rev. C. J. S. Bethune, M. A., and the Editor of the ENTOMOLOGIST. Several evenings were occupied by these "brethren of the net" in interesting and profitable discussions on the habits and peculiarities of various insects, the time passing so pleasantly that the midnight hours were reached ere a separation could be effected. After mature deliberation it was resolved to organize under the name of "The Entomological Club of the A. A. A. S," and the following constitution was adopted:

TITLE.

I. The name of the association shall be "The Entomological Club of the American Association for the Advancement of Science."

OBJECTS.

II. The annual reunion of the Entomologists of America, the advancement of entomology, and the consideration of all general questions relating to the science that may from time to time arise.

MEMBERSHIP.

III. All members of the American Association for the Advancement of Science who are interested in Entomology, shall *ipse facto* be members of the club.

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OFFICERS.

IV. The officers of the club shall be a President, a Vice-President, and a Secretary, to be elected annually by vote of the members.

DUTIES OF THE OFFICERS.

V. The President, or in his absence, the Vice-President, shall preside at all meetings; the Secretary shall perform all the usual duties of a recording and corresponding secretary.

MEETINGS.

VI. A meeting shall be held in each year at the place of meeting appointed by the American Association for the Advancement of Science; it shall commence at 2 : 30 p. m. on the day before the meeting of the American Association for the Advancement of Science, and be continued throughout that evening; further meetings may be held as time will permit during the week following.

The following resolutions were also unanimously passed:

Resolved, That the members of the American Entomological Society and the Entomological Society of Ontario, together with all other persons interested in entomological science, be cordially invited to attend and take part in the proceedings.

Resolved, That the secretary be requested to publish notices of the meeting in such periodicals devoted to natural history, and especially in those devoted to entomology as are published on the continent; and further, that the members be requested to bring with them at the annual reunions specimens for exchange and exhibition, and especially types of species that they may have described during the year.

At a subsequent meeting of the Club, the following officers were elected: President, Dr. John L. LeConte, Philadelphia, Pa.; Vice President, Samuel H. Scudder, Cambridge, Mass.; Secretary, Chas. V. Riley, St. Louis, Mo. We feel sure that under such able direction, the Entomological Club of the A. A. A. S. will prosper, and be the means of stimulating many to increased effort, and thus greatly advance the interests of our favorite study.

As it may interest many to know who were present at these meetings, we furnish the following list: Dr. John L. LeConte, Philadelphia, Pa.; Dr. J. G. Morris, Baltimore, Md.; Prof. S. S. Haldeman, Chickis, Pa.; Dr. H. A. Hagen, Cambridge, Mass.; S. H. Scudder, Cambridge, Mass.;

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A. R. Grote, Buffalo, N. Y.; Dr. G. M. Levette, Indianapolis, Ind.; C. V. Riley, St. Louis, Mo.; O. S. Westcott, Chicago, Ill.; J. A. Lintner, Albany, N. Y.; H. F. Bassett, Waterbury, Conn.; George Dimmock, Springfield, Mass.; B. Pickman Mann, Cambridge, Mass.; E. P. Austin, Cambridge, Mass.; Dr. R. King, Kalamazoo, Mich.; Chas. P. Dodge, Washington, D. C.; Mr. Patton, Waterbury, Conn.; Rev. C. J. S. Bethune, M. A., Port Hope, Ont.; W. Saunders, London, Ont. During the meetings of the Association several interesting and valuable papers on Entomological subjects were read by Dr. LeConte and Messrs. Scudder, Riley and Grote.

THE LINNEAN SIGNIFICATION OF THE GENERIC TERM PAPILIO.

BY H. HAGEN, CAMBRIDGE, MASS.

In a recent issue of the CANADIAN ENTOMOLOGIST, No. viii, Vol. vi, there appears from the pen of Mr. Scudder a paper on "The Linnean Signification of the Generic Term Papilio," containing some statements on which I propose to offer a few remarks.

The data given by Scudder from Linné's works are—save some minor typographical errors—correct, excepting in two important points. On p. 144 he says "in the year 1846 the first edition of the Fauna Suecica was published, *in which Linne for the first time treats of species, giving to them names in the language of the country.*" (The italics are mine.)

In the first place, Linné did never give either to animals or insects names in the language of his country. This is important in view of Mr. Scudder's proposition in "Psyche" to give such names for the convenience of non-entomologists. The names quoted by Scudder, viz., morio, polychloros, &c., are never given by Linné as *names of the species*, but just *at the end of the synonyms, quoted as synonyms*, always in this form, *vulgo* morio. These names were *never invented* by Linné, but were used by former naturalists; some are to be found in Petiver's Museum, viz., Oculus pavonis (not Oculis), Bella Donna, Ammiralis (the Admiral) Argus, in Rajus Hist. Ins. and in Albin. Engl. Insects, Brassicaria, Urticaria, etc.—the others in different other authors. Even Linné used some of them before, in his Elenchus, viz., Bella Donna, Oculus pavonis, and always in this manner:

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Bella Donna *dictus*, Oculus pavonis *dictus*, showing clearly that the names were not given by himself. Such names as are quoted with *vulgo* are not numerous, although in much larger proportion in Lepidoptera than in any other order. I find 25 such among 37 Papilio, and 14 Phalenæ only among the 114! described; in other orders the proportion is much less. There is not in the whole Fauna Suecica one name given by Linne. In the rare cases where Linne quotes Swedish names he has never given these himself, but quoted them as synonyms, as in Phal. mori.

Vulgo Bombyx.

Suecis Silkesmask.

In the end of the last and in the beginning of the present century there was a general tendency to give to every insect a name in the language of the country in which it was found. In this work labored Donovan for England, Fourcroy and Geoffroy for France, Sepp for Holland, Isert for Sweden, Bruennich for Denmark, Panzer and Sturm for Germany; but very soon it was seen that this business was a difficult one, often the names were not appropriate, some were foolish, and others even ridiculous, while it was apparent to all that such names, instead of being a benefit to science, were only a burden, and soon the matter was dropped entirely.

Even in the case of injurious insects it is seldom necessary to invent common names, for where species are really destructive the people almost always have a name for such just at hand.

With regard to the *second* point in the paragraph quoted, Linne treats of species first in a paper published in 1736, in Acta literaria et Scientiarum Sueciæ Upsala, T. iv, p. 97–138, *Animalia per Sueciam observata.* This paper is reprinted Lugduni Batav. 1743 in 8vo., *Elenchus animalium per Sueciam observatorum, p. 37–94.* Linne himself quotes this paper later always "Acta Upsal, 1736," and states in the preface of Fauna Suecica, 1st edition, "quum ad patriam Academiam Upsaliensem 1729 degerem, conquirendis insectis primam dedi operam, nec prius destiti, quam visendæ mihi essent 1735 aestivæ regiones. Eorum quæ reperi, catalogum a me exhibitum. Regia Scient. Soc. Upsal. actis suis pro anno 1736 inseruit."*

* When I studied in 1729 at my native Academy of Upsala, I collected chiefly insects, nor did I desist until I started to visit other countries in 1735. Of those which I found, the Royal Scientific Society of Upsala published in their proceedings for the year 1736 a catalogue prepared by me.

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The Elenchus (just as the first edition of the Fauna Suecica) has *no names of the species* (I say purposely so, as Linne called NOMINA TRIVIALIA what to-day is called SPECIES NAME, and Linne called NOMEN SPECIFICUM what to-day is called DIAGNOSIS) but always a diagnosis, and where it was possible, quotations of former authors, viz., Petiver Museum and Gazophylacium, Rajus, Albin, &c. The species given in the Elenchus are just as easily recognized as those in the Fauna Suecica, Ed. 1, by comparing the quoted authors and the diagnosis. It follows, therefore, that if the first edition of the Fauna be recognized to have right of priority, the Elenchus must be recognized to have the same right.

Now, the genus Papilio is established in Syst. Nat. Ed. 1, 1735. The Elenchus *is the first publication with species* (1736) after it, and the first Papilio is *P. Rhamni*, quoted as Papilio sulphureus Petiv. Mus. 1. Comparing Petiver's words and Linne's Fauna Suec., Ed. 1, No. 795, the identity of this Papilio sulphureus with P. Rhamni is sure.

I give here the list of the species of the Elenchus and of the first edition of the Fauna Suec., i and ii :

	Elenchus.		*Faun. Succ., Ed. i.*		*Ed. ii.*
1.	Rhamni mas.	1.	Antiopa.	1.	Machaon.
2.	Rhamni fem.	2.	Polychloros.	2.	Apollo.
3.	Brassicæ.	3.	Urticæ.	3.	Mnemosyne.
4.	Rapæ.	4.	C. album.	4.	Cratægi.
5.	Napi.	5.	Io.	5.	Brassicæ.
6.	Cratægi.	6.	Atalanta.	6.	Rapæ.
7.	Apollo.	7.	Cardui & follow	7.	Napi & follow
		24.	Rhamni.	12.	Rhamni.
10.	Antiopa.	25.	Cratægi.	21.	Antiopa.
11.	Polychloros.	26.	Napi.	22.	Polychloros.
12.	Urticæ.	27.	Rapæ.	23.	Urticæ.
13.	C. album.	28.	Brassicæ.	24.	C. album.
14.	Io.	31.	Apollo.	25.	Atalanta.

Follow ; Linne first (1736) places P. Rhamni at the head of the genus Papilio ; second, 1746–48 (the later editions until 1756 are only reprints) P. antiopa at the head, and third, 1758, and following, the swallow-tails at the head, beginning with P. priamus in Ed. x, Syst. Nat., and with P. machaon in Ed. 4, Fauna Suecica.

In the Fundamenta Entomologiæ, 1767, 4to p. 32, Linne speaks about the division of Papilio into five classes, devoting more than a page

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to this subject, and says strictly that his *Equites* form the first class, *Heliconii* the second, *Danaii* the third, *Nymphales* the fourth, *Plebeii* the fifth.

The closing lines in Mr. Scudder's paper should therefore be amended so as to read thus: "In Linne's mind which was a typical Papilio—Rhamni, or Antiopa, or Machaon? The answer is simply that Linne in his study arrived at the conclusion that the first class of his Papilio should be formed by the Equites. I would remark, however, that Linne *never speaks*, as far as I know, *of any particular species being the type of its class*, and *this idea that his first species is the type* is of very recent date.

The fact that so few Entomologists have the opportunity of consulting Linne's older works, induced me to publish these statements.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 153.)

ANTISPILA.

A. cornifoliella ? Clem.

Can there be two Antispila miners of the Dog-wood? Either there must be, and my specimens are specifically distinct from this species, or Dr. Clemens' description is strangely erroneous in at least one particular, viz., the color of the fascia and streaks, which he says are golden in *cornifoliella*, but which are silvery white in my specimens, all of which—six in uumber—agree exactly in ornamentation, and all but one of which are bred specimens. The species of the genus generally resemble each other very closely, and some recognized species do not differ from each other more than my specimens do from Dr. Clemens' description. Neither is it improbable that two species mine the leaves of the Dogwood, for the same thing occurs in Europe, where *A. Pfeifferella* and *A. Treitschkiella* both mine the leaves of *Cornus sanguinea*. *A. cornifoliella* and my specimens both mine the leaves of *Cornus florida*. I subjoin Dr.

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Clemens' description for the purpose of comparison with my own specimens :

" *Head, face, labial palpi and fore feet dark brown.* Antennae dark brown ; basal joint somewhat ochreous. Forewings rather dull dark brown, with a coppery hue. Near the base is a rather narrow, golden band, *not constricted on the fold, and rather indistinct toward the costa.* where it is somewhat suffused with a coppery hue, and nearest the base on the inner margin. At the apical third of the wing is a small golden spot, and nearly opposite, on the inner margin, another of the same hue, with the hinder portion of the wing tinged with a bright reddish coppery hue ; ciliae dark grayish. Hind wings purplish brown ; ciliae somewhat paler, with a coppery hue."

The italics are Dr. Clemens'. The following description is drawn from the six bred specimens above mentioned :

Head and face dark brown or brilliant metallic, according to the light ; labial palpi yellowish white ; tarsi all yellowish white, with each joint tipped with dark brown on its anterior margin. Antennae dark brown, with the two or three joints nearest the base ochreous, and *the extreme tip white.* Fore wings and thorax dark brown, blackish, bronzed or tinged with purple, according to the light ; before the middle of the wing is a slightly curved fascia, which is widest and nearest to the base on the dorsal margin, *not constricted on the fold, but quite distinct throughout.* A costal and dorsal streak just before the ciliae, the costal streak a little behind the dorsal one. In fresh specimens this fascia and these streaks are silvery white ; in old specimens they have a faint golden hue in some lights. (Clemens describes them as golden.) *Basal half of the ciliæ purplish ; apical half grayish silvery. Al. ex.* scarcely ¼ inch.

Dr. Clemens suggests that *cornifoliella* may be a variety of his *Nysæ foliella.* I have never succeeded in breeding the latter species.

A. isabella, Clem.

I find nearly the same differences between my specimens (bred) of this and Dr. Clemens' description, that I have noted above as to *cornifoliella.* Dr. Clemens says that the fore wings have no greenish or violet reflections, which is certainly incorrect. The fascia is wider than in *cornifoliella*, the thorax more shining metallic, the purple hinder marginal line is less distinct, and the entire wing is less purplish, and the species is a little larger. Nevertheless, they resemble each other very closely. The

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costal and dorsal spots in both are of nearly equal size, or the costal one is a little the largest.

A. viticordifoliella. N. sp?

Dr. Clemens mentions a mine and larva in grape leaves to which he gives this name, but he was not acquainted with the imago. Though it sometimes happens that more than one species of a genus mines leaves of the same plant, and it is therefore possible that the species described below may not be the same referred to by Clemens, yet from his description of the mine and larva, I feel confident that it is, and have therefore given it the name suggested by him.

Dark brown, inclining to blue black, with a purplish tinge in some lights, and in some lights bronzy brown or greenish; thorax and base of the wings with pink, purple or topaz red reflections, according to the light. A nearly straight silvery white fascia before the middle of the wings, not constricted on the fold, widest on the dorsal margin, where it is also a little nearer to the base; a large triangular silvery white dorsal streak just before the beginning of the ciliae, and a smaller one at the beginning of the costal ciliae. Ciliae white. Tarsi yellowish white, each joint tipped in front with dark brown. Face yellowish white; antennae dark brown, with about six terminal joints silvery white, and the six preceding ones alternately white and dark brown. It is a little smaller than *A. cornifoliella*. The mine, larva and case are smaller than those of *A. isabella*, and the case is elliptical in shape, whilst in *cornifoliella* and *isabella* it is nearly circular.

A. ampelopsifoliella. N. sp.

This species is known only in the larval state, unless the species described, but not named below, may be the same. The mine, larva and case are very small, smaller than any other known species. It mines the leaves of *Ampelopsis quinquefolia*, and the mine is elliptical in outline. I find that I have mislaid my notes upon the larva. I have never succeeded in breeding it.

Can not something be done towards determining the original of some cultivated plants by a knowledge of the habits of insects which feed upon them? A great majority of herbivorous insects are doubtless polyphagous, but many are confined to a single group of plants, and some to a single species. When an insect known to feed only on a single wild species, if found feeding on an allied cultivated plant, is it not a fair

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deduction that the cultivated one is derived from the wild stock? Dr. Clemens states that he bred his species *A. isabella* from the cultivated grape Isabella, which, if I am rightly informed, is supposed to be derived from *Vitis labrusca*. I have bred it from at least a dozen cultivated varieties, including Catawba, Hartford Prolific and Concord, but I have also bred it from the wild *Vitis cordifolia*, so that this instance proves nothing. But Dr. C. records the larva of *A. viticordifoliella* from the leaves of *V. cordifolia* only, and I have never found its mine in any other species or variety. Would there not be a presumption—if it should now be found mining any cultivated variety—that that variety sprang from the *cordifolia* stock? So Dr. C. records *Phyllocnistis vitigenella* from the leaves of *V. cordifolia* only, whilst I have found it in the leaves of a great many cultivated varieties, including those above named, so that it proves no more than *A. isabella;* but *P. vitifoliella* I have never found elsewhere than in the leaves of *V. cordifoliella*, and one or two cultivated vines of which I find I have kept no memorandum.

Some years ago I bought from the gardener of the late N. Longworth, of Cincinnatti, a grape vine of a variety but little cultivated, called "Longworth's Seedling, No. 20," the origin of which the gardener refused to tell me. The foliage is unlike that of any other grape known to me, and is still less like that of *Ampelopsis quinquefolia*, and approaches *V. cordifolia*. Last summer I found its leaves mined by a larva closely resembling that of *A. ampelopsifoliella*, *supra*, and which I suspect to be the same. I have never found it in the leaves of any other plant, though over a dozen other varieties of grapes grow within a few feet of the Longworth vine. From it I bred the species described below, which I do not now name, as it may prove to be identical with *A. ampelopsifoliella*. The single specimen was a little injured, and the description is therefore in one or two respects imperfect.

Palpi pale yellowish? Head and face bright but pale golden, in some lights silvery, tinged with golden. Antennae brown, *faintly* annulate with whitish. Thorax and primaries rich purplish brown, in some lights strongly purple or bronzed; before the middle of the primaries is a somewhat oblique fascia, which is silvery, or bright but pale golden according to the light, widest and nearer to the base of the wing on the dorsal margin, and not constricted on the fold; a silvery or pale bright golden spot on the dorsal margin, just before the ciliae, and a smaller costal one nearly opposite, *and a spot of the same hue at the apex.* Ciliae a little

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paler than the wings, but I can not discover any hinder marginal line. *Al. ex.* $\frac{1}{3}$ inch.

The larva is white, without maculae, but with the anterior margin of the first segment brown.

A. hydrangœella. N. sp.

The mine and larva only of this species is known, and I have never succeeded in rearing the imago. The mine, larva and case resemble those of *A. viticordifoliella*, but are perhaps a little smaller. It mines the leaves of the wild *Hydrangea (H. nivea.)*

Dr. Clemens states that the species described by him mine the leaves of the various plants in the latter part of August and in September, from which I infer that he found them only at that time. But the mines of all the species may be found as early as the first of July, and in increasing numbers from that time until the fall of the leaves. I have reared *A. cornifoliella* in the latter part of July, from leaves gathered in that month, and have found the mines and larvae of all the other species, though I have only succeeded in rearing the other species in the spring from mines gathered in the fall.

NOTES ON THE "LIST" OF 1868.

BY AUG. R. GROTE,

Curator of Articulata, Buffalo Soc. of Natural Sciences.

Preparatory to a fresh edition of the "List of Lep.," of 1868, a few memoranda of the necessary changes will be published.

Sesia uniformis, p iii. This species is distinct from *thysbe*, and has been noticed by Mr. Lintner in his valuable "Entomological Contributions." Mr. Couper found it on Anticosti. This can not be *Sesia ruficaudis* Kirby, the description of which is given on p. 27 of the "Synonymical Catalogue" of 1865. Kirby says: two first segments of the body yellow olive, two next black, the rest ferruginous with yellow olive spots. *Uniformis* has the first segments yellow olive, the next deep ferruginous, the next again olive, and the anal hairs black, with ferruginous central tuft. In fact, Kirby's description rather resembles *diffinis* in the body parts. And from his comparison with *fuciformis*, we should think

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at once of *diffinis*. But the terminal segments in *diffinis* are not "ferruginous" any more than in *uniformis*, and so Kirby may have had a boreal species we do not yet know before him. From his description there is no more correspondence with *uniformis* than with *thysbe;* rather does his description agree with *fuscicaudis* as to the abdomen terminally.

Cressonia juglandis, p. iv. To this species must be cited *Sm. pallens* of Mr. Strecker, whose figure represents a pale ♀ specimen of *C. juglandis*, without the median shade on the forewings. Belfrage has sent *C. juglandis* from Texas.

Dysodea || p. vi. This generic name is preoccupied and must give way to that of *Platythyris*. Mr. Walker's type of *Varnia* appears distinct. We have probably but one species which should be known as *Platythyris oculatana*. Boisduval's figure and description of *Vitrina* do not agree with our species, and probably *vitrina* represents *oculatana* in Europe. Much confusion has occurred through Dr. Clemens having described the species figured by us, Am. Lyc. Nat. Hist., N. Y., vol. viii, pl. 13, figs. 4–5, as one of the Tortricidæ, and without referring to Boisduval's original illustration of the genus. A second species is afterwards described by Dr. Clemens under the name of *Dysodia margaritana*, which I have never seen. Consult Am. Soc. Belge, T. 7, Pl. 1, for an illustration ot the embryonic stages of *Thyris*. They seem to correspond generally very well with Dr. Clemens' characters of the larva of *Dysodea*.

NOTES ON MEGACHILE CENTUNCULARIS.

BY THOS. G. GENTRY. GERMANTOWN, PA.

Since so much has been written upon the habits of our ordinary Leaf-cutting Bee, it would seem presumptuous for me to offer anything further in connection therewith. But a few facts which came to my notice recently are sufficiently interesting and important to merit publication.

During the latter part of June, 1873, several cells, a half a dozen in number, were sent to me by a friend, who had accidentally brought them to light while digging underneath the shade of a *Spiræa corymbosa*. They were found in close proximity to each other, arranged in a nearly horizontal position, at a depth of three inches below the surface of the

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ground. The soil was comparatively solid. From the freshness of the leaves which composed the cells it would seem that the work had but lately been accomplished, but after the examination of a few, it was evident that some time had elapsed, since the larvae had attained to considerable dimensions.

The cells were nearly three-quarters of an inch in length, with a diameter of one-fourth of an inch. They were constructed of nearly perfect leaves of *Spiraea corymbosa*, instead of those of the various species of Rose. The outermost circle of leaves, three in number, had their margins slightly overlapping on the exterior, each piece forming an arc of a circle of 120 degrees. Within these were other three, arranged alternately with them; others, again, alternating with the latter, and so on until there were no less than six circles, having eighteen pieces in all. Each succeeding individual layer from without inwardly projected but slightly beyond its predecessor, having but a slight resemblance "to a long sleeve with folds upon it," as has been affirmed by writers. The mouth of each cell was closed by six circular pieces of leaves, nipped from the same plants. These were a trifle larger than the mouth of the cell, and when in position presented a concave surface facing outwardly. It is obvious that the whole structure is a striking proof of adaptation to an end. If the cell had been arranged vertically, its structure would doubtless have afforded water a ready access to the larva and its food, and thus have defeated the object which nature had in view. In the horizontal position the tile-like arrangement in the exterior, acts as a sort of roof by which the water is turned off. The concave arrangement of the circular pieces subserves a similar purpose. The freshness of the leaves was due, no doubt, to the protection which the enveloping earth afforded. The chemical rays of sunlight, which act upon the parenchymatous material of the leaf, when deprived of its vitality, converting the green and granular chlorophyl into others of a brownish hue, operate with less intensity at the depth of three inches. The comparative absence of moisture in the ground, no doubt, prevents oxidation; there being ample moisture at the same time to insure softness and prevent rigidity.

During the early part of last April (1874), several cells were brought to me by one of my pupils, which, on a superficial examination, appeared to be the mud cells of our ordinary *Pelopœus*, the mud-dauber. They were found adherent to the rafters of an unplastered attic. The cells were arranged side by side in numbers of three. On the exterior there

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were no shallow grooves, denoting lines of demarcation. With this unimportant difference, the general outline of the mud mass, with its combination of pellets, was exactly similar to that constructed by the mud-dauber. Had the lines of separation existed, I should have had no hesitancy in characterizing it as a case either of usurpation of instinct upon the part of the *Megachile*, or one of confiscation of property.

Within, exposed to view by detachment from the aforesaid rafters, were what I supposed to be the leafy cells of *Megachile*. The length of these and the peculiar disposition of their parts, materially different from what I had always observed, operated upon my mind to such an extent that I was almost constrained to believe that I had met with something altogether new to science, or else that I had been fortunate enough to discover a species of *Pelopæus* with *Megachile*-like habits.

Each cell was one and one-eighth inches in length, with a diameter slightly exceeding one-fourth of an inch. It was built of elliptical pieces snipped from the leaves of a species of *Spiræa (S. corymbosa*, it seemed to me.) The pieces were of less dimensions than those before alluded to, and arranged somewhat on a similar plan, except that there was a strong appearance of a double cell, as if the inferior concavity of one cell had been deposited in the superior concavity or mouth of the other. This resemblance held true to a certain extent, but the absence of a clear line of division between the two seemed to militate against the idea of a double arrangement.

Having kept a few of the cells a reasonable length of time, until all hope of seeing insects emerge therefrom had vanished, I began the work of destruction by carefully pulling some of them to pieces. While engaged in my labor I was led to notice the comparative ease with which each relative structure separated in the middle. Within the aperture of one cell was a cylindrical pouch, composed of pure silk, glazed within by an oily secretion from the larva. This containsd a perfect, but dead bee, which was readily identified as *Megachile centuncularis*. The lower half of the same enclosed a similar silken sack, with fragments of legs, wings, antennæ and complete body segments, with a mass of debris which showed the clearest evidence of the ravages of some ruthless destroyer. Under a glass of moderate power, I had little difficulty in recognizing the fragments as parts of a *Megachile* similar to the above.

This last fact impressed me as peculiarly interesting and novel, as showing the economy which exists and is practiced among certain

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individuals of this species. To construct the inner leafy cells, with their numerous parts, is a labor of little moment when contrasted with the hours that must be spent in moulding the clay for the outer side into small pellets, and then adjusting them to their proper positions. The existence of two bees in separate cases of silk, one above the other, in the same earthy apartment, seems to imply the existence of a double leafy cell, even though a partition between the two should be wanting.

It would appear that the deposition of one cell upon another would defeat the object which the mother *Megachile* had in view. On the supposition that oviposition in the upper cell took place subsequently to that in the lower, the time of leaving the egg would be earlier in the latter, the larva would sooner mature, and the perfect insect would be prepared to leave its prison-house anterior to its associate, and, being unable to effect its exit by reason of the narrowness of its domicile, would perish. This, doubtless, would be the upshot of the affair if similar cells in like situations should be built in the summer season. But as far as I have had any experience in the matter, the summer abodes of *Megachile* are single, a few inches below the surface of the ground, and generally under the shelter of some protecting shrub, where the warm rays of the sun can not effect any mischief. This site is doubtless well selected for the reasons above adduced.

There are usually two broods of this species in a season; a summer brood, which makes its appearance early in July, and a spring brood which has survived the winter in its double cell of earth and leaves. It is possible that the larva, after having exhausted its stock of honey and pollen, its natural food early in the fall, passes into the condition of a pupa, and thus remains until awakened from its sleep by the genial warmth of spring.

In the cells designed for the winter accommodation of the species, the double arrangement of the inner cells will not materially affect the original purpose, since both insects will have passed through the cycle of transformations, and when the suitable time shall have arrived for their departure, the one occupying the upper cell will have made its way out and thus left a clear passage for the one below.

The absence of a line of separation between the two cells appears to indicate that the food had been deposited in the lower cell, and two eggs instead of one had been left in mistake. Where it is the custom of the insect to deposit but one egg, instinct teaches it to collect just enough

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food to provide for the sustenance of the larva to which it gives birth; the two eggs in the present cases were deposited through some inadvertence upon the part of the insect, and it does not seem wise to conclude that a similar inadvertency had led to an accumulation of a double portion of food. If this double brood had been the result of mistake, it is not possible that several mistakes of a similar kind would have occurred, since it was my good fortune to meet with unoccupied cells that showed evidence of being once occupied.

If two eggs are deposited within the same cell, there must be collected a double quantity of pollen and honey for the nourishment of the larvæ. The one which attained to full growth first would, no doubt, seek a clear space in which to spin its covering, and this would be afforded by the upper part of the tube or upper cell. The other, after having made a sufficient space for this essential operation by the consumption of the remaining food, would accomplish the task therein.

Some cells, which it was my privilege to examine, exhibited faint tracings of a partition-like arrangement between them. A portion of the debris in the lower cell, to which reference has been previously made, may have been due to the comminution of the leaves forming the separating layers, through some cause or other. But this I am unable to substantiate. If such should prove to be the case by future observations, there is no doubt that there will be found to exist a separate accumulation of pollen and honey in each cell.

After a little reflection, there seems to be an offset to a portion of this argument. May it not be possible that after the two larvæ had matured into perfect insects, the more powerful one overcame the weaker, and that the fragments of wings, legs, body segments, &c., are the sad trophies of such a conflict? This point would be worthy of acceptance if every cell which was examined had betrayed similar evidences. But it was not the case. It only remains, then, to assume one of two opinions—either that the two ova were deposited upon a double allowance of food, so that the larvæ, when hatched, should find ample sustenance to reach maturity, and subsequently had constructed their silken cocoons in their respective positions, said positions being determined upon by priority of growth; or, that a double cell was built, one on the top of the other, each properly victualled and provided with an ovum.

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STRAY NOTES ON CANADIAN DIPTERA.

BY BEVERLEY R. MORRIS, M. D., NOTTINGHAM, ENGLAND.

The following fragmentary notes are submitted to the readers of the CANADIAN ENTOMOLOGIST in the hope that they may assist in even a small measure in determining the numbers of this order occurring in the Dominion.

When in Canada I only incidentally captured Diptera, and the number I possess is very limited. I am indebted to F. Smith, Esq., of the British Museum, for the names of those given below. There are some other species as yet undetermined, and which on some future occasion I may succeed in getting named. The localities and dates given may be relied upon, as I numbered every insect taken, and recorded the date and locality at the time. I have included a few taken in New Hampshire and Maine, as it is probable they may also be found in Canada. Apologizing for the imperfection of the list, I send it in hope of assisting any one who may take up the Diptera of Canada. For the labels being lost off some I am indebted to the gross carelessness of one of our railways, over which the cabinet containing my insects was sent. I found great numbers loose, some ground to powder, others more or less injured, and many with the tickets shaken off. This prevents my being certain of the localities, &c., in some cases, but I *believe* all were taken in or near Toronto.

Anthrax fuscipennis, Say.

I took this fly in considerable numbers on the carriage drive in front of the Rev. W. Ritchie's, at Georgina, on the 8th of August, 1863. They were hovering over holes in the gravel.

Anthrax analis, Say.

Taken at the same time and place, and along with the last. Habits the same.

Anthrax bastardi, Macq.

One was taken at Orillia in August, 1863. I also took one at Gorham, in New Hampshire, on August 19th, 1861.

Anthrax terminipennis, Say.

Labels lost, but taken, I believe, at Toronto.

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Anthrax fulvina, Say.

Taken at Orilia the end of July, 1863; also at Cape Cottage, Portland, Maine, July 29th, 1861, and up to August 8th.

Stratiomis ischiaca, Harris.

At Cape Cottage, Portland, August 2nd, 1861.

Syritta proxima, Say.

Taken at Cape Cottage, Portland, on August 3rd, 1861.

Syrphus Ribesii, Fab.

Label lost, but I believe taken at Toronto.

Syrphus agnon, Walk.

At Toronto, in our garden, Nov. 10, 1861.

Eristalis inflexus, Walk.

Cape Cottage, Portland, July 22nd, 1861.

Eristalis sincerus, Harris.

At Toronto in 1860.

Eristalis nebulosus, Walk.

Label lost.

Conops sagittaria, Say.

Near Cape Cottage, Portland, July 24th, 1861. Two specimens.

Tachina finitima, Walk.

Cape Cottage, Portland, August 7th, 1861. Common.

Tachina apicifera, Walk.

College Avenue, Toronto, June 3rd, 1858. Cape Cottage, Portland, July 27th, 1861.

Tachina iterans, Walk.

Label lost. Probably Toronto.

——— ———? Sp.

At Orilia in August, 1863. Same size as *T. finitima*. Abdomen black, with a white spot at the side of each segment.

——— ———? Sp.

Bred from a chrysalis of some moth at Toronto, April 2nd, 1862. Rather smaller than the last species. Abdomen black, with somewhat obsolete white spots on side of each segment. Eyes reddish.

——— ———? Sp.

Somewhat like the last, but only half the size. Label lost.

——— ———? Sp.

Label lost. Same size as last. Wings iridescent; body black; eyes brownish red.

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Chrysops carbonarius, Walk.

Taken at the Humber, Toronto, June 13th, 1863.

Asilus ——— ? Sp.

Cape Cottage, Portland, August 16th, 1861. A large species, measuring an inch and a quarter in length, and nearly an inch and a half in expanse of wings.

CORRESPONDENCE.

EXPLANATORY.

DEAR SIR,—

The following considerations have suggested themselves to me in reference to Mr. Herman Strecker's recent personal attacks. For myself I do not think that either Mr. Strecker's style or language can be defended on any ground. As to the matter, this is furnished by certain synonyms in my writings on North American moths. To those conversant with the subject, it is not necessary to point out the fewness of such mistakes, but it may have escaped notice that in nearly every instance I have been the first to correct the mistake, and thus Mr. Strecker's abuse has come *ex post facto* and proves itself wholly personal and unscientific. I take pleasure in referring here to words used in my earliest paper (Proc. Acad. Nat. Sci. Phil., 1862, p. 59). I think I have always lived up to my first statement, and where I have made a synonym, both "willingly and gladly" acknowledged it. And although I am charged by Mr. Strecker with allowing one mistake to remain "nineteen months" before correction, I can assure him that I still corrected it the moment I became aware that it existed. Certain of these mistakes have occurred in describing American species under distinct names. Sometimes these species have turned out to be the same with European forms, and a synonym has been the result. I do not think this the great misfortune which Mr. Strecker pretends, the less when we remember that in many instances the American specimens may be distinguished, and I have suggested that we shall lose a knowledge of these distinguishing points unless we use distinguishing names. Certainly these are occasions for quiet scientific observation, not in any case for unscientific vituperation. The difficulty of avoiding a giving of too great weight to a remote locality is even instanced by Mr. Strecker, who has re-described a ♀ *Cressonia juglandis* as a new species of *Smerinthus* from "Texas." The pale specimen, merely wanting the

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median shade on the primaries, would, if caught, say in Reading, have hardly furnished one of Mr. Strecker's "coveted" novelties. Again, instances are on record where naturalists have first considered the American species the same as the European, and then changed their views and described them as distinct. An instance of this is offered by *Brephos infans*, first described as the same as the European *Brephos parthenias*. The amount of error is no greater in the one case than the other.

At the time that I commenced my labors, the difficulty of determining our species of moths was very great, certainly much greater than it is now. That this change is in part due to my work I think is true, equally so that Mr. Strecker is both unjust and ungrateful to omit the consideration from his mind. How much he himself is indebted to my labors may be seen by comparing my work on the genus *Catocala* with his own on the same subject. His figures and determinations are taken from the collection I studied and the paper I published; and, in reality, his figures merely supplement my original work. That Mr. Strecker has so generally coincided with me in his specific discriminations in the genus *Catocala*, is, I think, less a compliment to my correctness than a proof of Mr. Strecker's ready acceptance of assistance.

I have a few special remarks with which to conclude. I am blamed for retaining the name *C. ponderosa* instead of the earlier *C. nebulosa* || for a species of *Catocala*. From Linnæus to Lederer it has been customary to avoid the repetition of names in the same family of moths, and Guenée has changed the name of a species of *Catocala* on account of an *Anarta* bearing the same specific title. I have never changed the name of another author on this account; my opinion (as, indeed, cited by Mr. Strecker) being that a fresh name is unnecessary. I have merely, where two names were attached to the same species, preferred the later when the earlier had been previously used. Whether my descriptions in the genus *Catocala* are the best, I will not dispute with Mr. Strecker; in his comments on *C. ponderosa* Mr. Strecker forgets that we figured the species, in justice to Mr. Wiest, the artist, I think very acceptably. Nor will I allow Mr. Strecker the proper authority to discuss the value of structural characters in the Lepidoptera, seeing that he has shown no experience in the matter, and is unable to discriminate even between the sexes of *Catocala* when the abdomen is wanting.

A. R. GROTE.

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SYNONYMICAL NOTE.

Dr. Boisduval has recently re-described *Eudryas grata* (Fabr.) from Georgia under the name *Eudryas assimilis*, with the remark: Cette belle espece n'a pas encore ete figuree. It is manifestly unimportant to Dr. Boisduval that the science of Entomology is pursued in America. In this same paper (Revue et Magasin de Zoologie, 1874) the genus *Alypia* is erroneously attributed to Kirby, and a citation is given: "*Sphinx octomaculata* Hubn. Zut., 119, 120." which does not exist, the proper citation being "*Alypia octomaculalis* Hubn., Zutr., No. 60, fig. 119, 120."

Dr. Boisduval separates Drury's figure of *Urania rhipheus* (1773) from Cramer's (1782), under the new name of *Urania Druryi*. This is, however, a simple synonym in any event, since Drury's species must retain the name of *Rhipheus* as originally proposed. Cramer himself says, when describing his *Rhipheus*, T. 3, p. 193, "Ce beau Papillon et qui est tres rare, ressemble beaucoup a' celui qui a ete annonce par Mr. Drury dans ses Illustrations of Natural History, Vol. 2, pl. 23, figs. 1, 2, *sous le nom que nous lui donnons ci-dessus.*" Guenes, in 1857, also draws attention to this mistake of Dr. Boisduval's, then only proposed to be committed. It has been generally conceded that Drury's species is the same as Cramer's, and that the differences in the figures arose from an intentional mutilation of Drury's original specimen. Dr. Boisduval's quotation from Lacordaire would hardly cover such a case as this, in which a pair of scissors very probably effected "la creation." To find another "taille sur le meme patron," would argue, then, a lack of conscience somewhere, as well as the sacrifice of a specimen. But Dr. Boisduval insists on other characters to separate the two species than the absence of the tails, i. e., the large size and the ornamentation of the fore wings of *Rhipheus* Drury. So in this case we should have two species, i. e., *Chrysiridia Rhipheus* (Drury) nec Hubn. (= *Urania Druryi* Boisd.) and *Chrysiridia Orientalis* (Swains) (= *Rhipheus* Cramer 385, A. B.; *Chrysiridia Rhiphearia* Hubn.)

A. R. GROTE.

Our usual acknowledgements of books received have been omitted for want of space, they will appear in our next.—ED. C. E.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., OCTOBER, 1874. No. 10

ANNUAL ADDRESS OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1874.

To the Members of the Entomological Society of Ontario :

GENTLEMEN,—I beg to offer you again, after the lapse of a year, my hearty congratulations upon the continued prosperity of our Society. As you have already learnt from the Report of our Secretary-Treasurer, we have been favored with a slight increase in our list of membership—as large, indeed, as can fairly be expected in a Society which confines itself to the study of a particular branch of Natural Science, and which cannot therefore attract into its ranks many who are not specially engaged, to some extent at least, in this limited field of investigation.

It is especially pleasing to find that our number of branches continues to increase—a highly successful one, with its headquarters in Montreal, having been organized since our last annual meeting. Its first annual report has been already presented to us in the pages of our journal.

The CANADIAN ENTOMOLOGIST, upon whose success the well-being and fair fame of our Society so largely depends, has—I am sure you will all agree with me—been more ably sustained than ever before. The thanks of the whole Society are assuredly due to the energetic and talented Editor, Mr. Saunders, who has been, indeed, its mainstay from the issue of its first number until now. It would be well if all our members would aid him, not only by contributions, but also by increasing the circulation, and thereby improving the means of support of the publication.

When I applied just now the term "limited" to our field of enquiry, I only did so when considering Entomology as one amongst a large number of sections of the great circle of natural sciences, which includes within its area the study of all things material which come within the range of man's intellectual powers. If we look, however, at Entomology and its objects alone, we cannot fail to see at once that it is practically

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without limit—that there is work enough for thousands of investigators for almost innumerable generations to come. And when we couple with Entomology other kindred sciences, such as Botany, Geology and Physical Geography, which are so closely allied that no student can safely overlook them, we begin almost to be overwhelmed with the vast extent of this field of knowledge that we seek to explore. So vast, indeed, is the field that no one now ventures to survey the whole of it, except in a very general way; each explorer finds himself compelled—if he would do any effective work—to confine his labour to some one or two of its sections or subsections. By this division of labour, all departments of the Science will by degrees be taken up, and much that is now a '*terra incognita*' will become familiar to the patient explorer.

In our own country—within the bounds of this great Dominion—there is need of many more students and explorers. Even in this Province of Ontario, the headquarters of our Society, where more has been done than in any other part of Canada, there is yet room for a great increase to our band of collectors and investigators. How incomplete, for instance, is even yet our list of Diurnal Lepidoptera, and how many pages are still blank in the life history of some of our commonest butterflies? Our able Editor, my excellent friend, Mr. Saunders, has done much to fill up these blank pages, and his work is everywhere recognized as thorough and authoritative; but yet there remains much more to be done, that we hope our members will before long accomplish. If we turn to Crepuscular and Nocturnal Lepidoptera, we must feel almost appalled at the extent of our ignorance. For those who have the time and the ability, I can think of no more interesting or attractive field of enquiry—none that will sooner or better repay the pains-taking student, whether he looks for fame or pleasure, whether he sighs for fresh fields to conquer, or desires to set his foot where man has not trodden before. In a department where so much remains to be done, we all, I am sure, offer a most cordial welcome to one who has recently cast in his lot among us, and has traversed the broad Atlantic in order to study the Noctuidæ of this country. I allude to Mr. George Norman, of St. Catharines, late of Forres, in Scotland.

In another order of insects, the Coleoptera, much no doubt has been accomplished. Through the pains-taking labours of a Billings and a Pettit, not to mention other good workers, and by the aid of the great authorities in the neighbouring States, Dr. Leconte and Dr. Horn in particular, we have been able to increase our list of Canadian beetles from a few hundreds at the birth of the Society, to more than as many thousands

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now. But still how very much more remains to be done? What a field of labour there is before both student and collector in the Carabidæ, the Staphylinidæ, the Curculionidæ and other numerous families of beetles! May we not hope that during the coming winter our present scattered stores of knowledge will be utilized and made available for the good of all, by the compilation and publication of a large addition to our old and valuable list of Canadian Coleoptera?

If there remains so much to be done in these two favorite orders, what shall I say of the remainder, that are so generally neglected? It is surely time that some of our members should devote themselves to the working up of such interesting orders as the Neuroptera, the Hymenoptera, the Orthoptera, the Hemiptera, even if no one can be found at present to take up the study of the more difficult Diptera.

In all these orders there is the nucleus of a collection in the cabinets of our Society, while no doubt much additional material would be furnished by individuals to any member who will take up in earnest the study of any one of them. It would be a great contribution to our knowledge of Canadian insects if there could be published by the Society carefully prepared lists of as many species as possible in each of these orders. Such lists would, of course, be very incomplete at first, but they could easily be so arranged in publication that additions might be made to them at any time, as our stores of knowledge increase.

Such, gentlemen, are some of the modes in which, I think, we should endeavour to extend the operations of our Society. If each year, when we assemble together for our annual meeting, we can point to some such work done in the previous twelvemonth, we shall have good reason to congratulate ourselves upon real permanent progress—upon building up the foundation of an Entomological structure that will prove enduring and substantial in time to come.

Thus far I have referred to Entomology as a purely scientific pursuit; there is another aspect in which we cannot refrain from regarding it, viz., as a subject of very great economic importance to every inhabitant of our land. This view of Entomology has been especially brought before us of late by the havoc that has been produced in our farms and gardens by hordes of destructive insects.

The dreaded Colorado Potato Beetle (*Doryphora decem-lineata*) has spread eastward with great rapidity, and has now reached the Atlantic coast in some parts of the United States. I have been informed by

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friends who reside in various parts of the Union, that while little, if any, diminution in the numbers of the pest is to be observed in the west, it is becoming very destructive where it has attained to its second year of colonization. During the first year of its invasion of a particular locality, no appreciable damage is done by it, but as its armies increase in geometrical progression, the potato crops of the following season generally suffer to a terrible extent. It has now covered the whole of the Province of Ontario, and is very destructive throughout the western half of it, though we are happy to say that our intelligent farmers and gardeners are effectually using the remedies suggested by our colleagues, Messrs Saunders and Reed, in their Report to the Legislature a few years ago. In Quebec it is but beginning to be observed; no doubt it will be found there in myriads next year. Across the border, it has penetrated to the western portion of Vermont, into New Jersey, down to the sea coast in Pennsylvania, and in Maryland; at Baltimore, Md., it is very abundant, while straggling outposts have been found as far south as Washington. The whole of New York and Ohio have been pretty well covered with the insect, while in Missouri it is as abundant as ever. In Indiana and Michigan there is a local diminution in the numbers of the pest, but no where are there as yet any signs of its cessation. The people of Europe are now beginning—and with good reason—to feel alarmed at the prospect of its crossing the Atlantic. The English and French scientific and agricultural publications are commencing to publish notices of the insect and to talk of restrictive measures, while in Germany, we are told that stringent regulations will probably soon be put in force by the Government to prevent the invasion of the country. Unless some regulations of this kind are put in general force throughout the whole of Western Europe, I believe that—judging from the spread of noxious European insects on this side of the Atlantic—the Colorado Beetle will soon become there as familiar an object and as destructive a pest as it is here.

While the Colorado Beetle from the Rocky Mountains has been overspreading the whole northern continent eastward, there has been moving southward and westward in a similar manner another insect—the Cabbage Butterfly (*Pieris rapæ*)—that is almost as injurious as the other. This insect, an European importation, as of course you all know, starting from Quebec some few years ago—there first noticed by our friends, Messrs. Couper and Bowles—has now spread westward over almost the whole of Ontario. At Port Hope it has been this year by far the most common of all butterflies; thousands were to be seen throughout the whole

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season, from early summer to the present time, flitting about along every road, and hundreds hovering over or alighting in every garden. There is hardly a cabbage or cauliflower fit to be eaten anywhere in the neighbourhood, while stocks and mignonette have been ruthlessly demolished in all the flower gardens. Its spread westward, however, has hardly been as rapid as its movements to the south. The two maritime provinces of New Brunswick and Nova Scotia, and all the New England States, have for some time been occupied, and now I am told that this year it is most plentiful as far south as Washington, and that it is by no means rare in Virginia.

While referring to the wonderful spread of noxious insects during the past few years, and to their excessive prevalence now, I must not omit to mention the affliction caused to our north-west Province of Manitoba and to many of the western States by the swarms of locusts, or grasshoppers as they are termed (*Caloptenus spretus*). The accounts of the sufferings caused by this terrible plague are perfectly appalling, and rival anything that we have read of the ravages of the Eastern locusts. Happily for us they do not seem to extend much further to the east than the Missouri River, though, occasionally they penetrate to some of the broad prairies beyond. As a detailed account of this insect will probably be afforded you in the forthcoming Annual Report of our Society, I need not detain you with any further remarks upon it.

The only other insect to which I need now call your attention for a moment, is the Grape-Vine *Phylloxera*. I am glad to learn that its ravages in the vineyards to the south of us have been comparatively trifling this year, and that in all probability the summer droughts to which we are so liable, will prevent its ever being as formidable a foe as was at one time apprehended.

To turn from this not very cheerful subject, I may mention, before concluding, that Mr. Saunders and myself duly attended the recent meeting at Hartford, Conn., of the American Association for the Advancement of Science. There we had the pleasure of meeting a large number of Entomologists from all parts of the United States, and we had the further gratification also, of being presided over, in general session, by the ablest of American Entomologists, Dr. Leconte, and in the Zoological Section, by another great worker in our department, Mr. S. H. Scudder. Informal meetings of Entomologists were frequently held, and finally it was agreed upon to form an Entomological Club of Members of the A.A.A.S., who should assemble annually a day before the meeting of the Association

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in the place that may be from time to time selected for its sessions. In this way we trust that much may be done for the furtherance of our favourite branch of science, and that Entomologists generally, from all parts of the continent, will bring together their types of new species and the surplus of their collections for mutual information and benefit.

Without further trespassing upon your time and attention, I beg to thank you, gentlemen, for the kind consideration you have shown to my colleagues and myself during our term of office, and with hearty wishes for the continued prosperity of our Society,

I have the honour to be, gentlemen,

Your obedient servant,

CHARLES J. S. BETHUNE,

President E. S. of O.

Trinity College School, Port Hope, Sept. 22, 1874.

ON SOME CHANGES IN THE NOMENCLATURE OF NORTH AMERICAN COLEOPTERA, WHICH HAVE BEEN RECENTLY PROPOSED.

BY JOHN L. LECONTE, M. D., PHILADELPHIA.

Since the issue of the Check List of N. A. Coleoptera by the late Mr. G. R. Crotch, I have been asked by several persons interested in that branch of science, if I would advise them to change the labels in their collections in accordance with the nomenclature of several familiar genera as therein set forth. To all such applicants I have answered, that such changes are not expedient, unless they are fully convinced of the propriety of admitting them. For my part, I considered them quite unnecessary, and still further, contrary to the code of laws of nomenclature under which I supposed we were acting.

Circumstances, which it is unimportant for me to specify, have prevented me from heretofore making known the views upon which I formed the opinion thus given, but as confusion of ideas upon the adoption or non-adoption of Mr. Crotch's nomenclature now exists, I think that the time has now arrived for a full discussion of the subject.

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For the purpose of confining attention to the more radical changes proposed, I will leave for a future time all questions relating to specific names, and consider at present only those affecting genera.

With the exception of some very unimportant examples, these chiefly turn upon the validity of the genera proposed and defined by Dr. Geoffroy in his Histoire Abregee des Insectes.

The first edition of this valuable work, in which, as is justly said by Mr. Crotch, he displayed "a degree of acumen far in advance of his age," bears date on the title page, 1764*, and was printed at Paris. The last edition, with supplements, was printed also in Paris, year of the Republic vii, (1799.)

The binominal nomenclature was first distinctly used in zoology in the 10th edition of the Systema Naturæ, by Linnæus, in 1758, and repeated in the 12th edition, 1766–67.

After the publication of the work last mentioned, Fabricius and others, devoting themselves more exclusively to entomology than Linnæus had done, divided his genera, and in describing new ones adopted other names for several of those described by Geoffroy.

The names of these later authors have, until the changes proposed by Mr. Crotch, been adopted without cavil.

Thus much as to the history of the question. Now as to the argument.

The most systematic attempt to reduce the laws of nomenclature in zoology to a code, capable of being easily understood and applied, was that of the British Association, acting through a committee, which reported at the meeting held in 1842.

Without discussing the details of this report, some of which might be and, indeed, were subjected to criticism, it is sufficient to state that the principles therein recommended were adopted by the Association, and without important modification, were reaffirmed by the Association of American Geologists and Naturalists at the meeting held in 1845.† These laws have been accepted and acted on by nearly all investigators in Natural History ever since.

Some discussions having taken place which indicated a possibility of improving the code, it was again referred by the British Association to

* Mr. Crotch states 1762, but I know not on what authority.

† Am. Journ., 2nd series, ii, 423—(1846).

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a committee, which reported substantially the same rules, with a few closer definitions of moot points and some useful commentaries upon certain rules.

This report was adopted at the meeting in 1865, and was reprinted with notes by Prof. A. E. Verrill, in the American Journal of Science and Arts, 2nd ser., xlviii, 92, in 1869.

It would therefore appear that the common law under which Zoologists now act in questions of nomenclature, is the code, the history of which I have just given. The only other alternative is, that there are no established rules, and that in the Republic of Science each citizen is a judge, capable of expounding the law for himself, and amenable to no tribunal.

I will therefore assume that until a different code is formally adopted, American naturalists are disposed to abide by the recommendations of the two important scientific bodies, whose reports are above mentioned.

As the language of all three reports is equally clear and definite upon the points I wish to make against the reception of the Geoffroy'an genera, I shall quote from the latest, reprinted in Silliman's Journal, 1869, as being most easy of reference.

" Rule III. The committee are of opinion, after much deliberation, that the XIIth edition of the Systema Naturae is that to which the limit of time should apply, viz., 1766 "..... (p. 94.)

P. 96. "As our subject matter is strictly confined to the *binomial system of nomenclature*, or that which indicates species by means of two Latin words, the one generic, the other specific, and as this invaluable method originated solely with Linnaeus, it is clear that as far as species are concerned, we ought not to attempt to carry back the principle of priority beyond the date of the 12th ed. of the Systema Naturae, 1766. Previous to that period, naturalists were wont to indicate species not by a name comprised in one word, but by a *definition* which occupied a sentence, the extreme verbosity of which method was productive of great inconvenience."..... (p. 97.) "The same reasons apply to genera."....
" Brisson, who was a contemporary of Linnaeus and acquainted with the Systema Naturae, defined and published certain genera of birds which are *additional* to those in the 12th edition of Linnaeus' works, and which are therefore of perfectly good authority. But Brisson still adhered to the old method of designating species by a sentence instead of a word, and therefore while we retain his defined genera, we do not extend the same indulgence to the titles of his species, even when the latter are accidentally binomial in form."

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By reference to the several editions of Geoffroy it will be seen, 1st, that he did not adopt the binominal nomenclature, except in regard to the additional species described in the supplements to the edition of 1799*; 2nd, that he did not admit himself any rule of priority in generic names, inasmuch as he described genera previously proposed by Linnæus under other names, quoting Linnæus in synonymy; 3rd, that he made no reclamation either in genera or species, in the last edition of his work.

It must also be kept in mind that Olivier and Latreille, cotemporaries and friends of Geoffroy, used his generic names only so far as they did not conflict with the genera established by other authors up to the date of their respective memoirs. They did not therefore 'revive' these names, as claimed by Mr. Crotch, but adopted them and introduced them into the proper and permanent literature of scientific terminology, thus placing them upon a new basis.

It would therefore appear, that notwithstanding the great value of the work of Geoffroy, and the importance of the views of classification which he proposed (and none will be more ready to admit the merit of his labors than myself,) he did, by an unfortunate want of appreciation of the necessity of adopting the Linnæan binominal nomenclature, and by not recognizing the principle of priority, exclude himself from being cited *either for genus or species* under the existing code, except so far as relates to the supplemental species in the edition of 1799.

In all other instances the names of his genera are free, and must be attributed to the authors who subsequently employed and defined them, either *with* or *without* reference to his use of the names.

In order that the evidence upon which I have based my opinion may be readily accessible, I have appended the remarks of Mr. Crotch upon the priority of his names, and two tables, one of synonyms, the other of homonyms of all the Coleopterous genera defined by Geoffroy.

In conclusion, I would recommend to those who use the Check List to substitute for the generic names adopted from Geoffroy in that work, the following, which have been in current use:

P. 37.—*Peltis* Geoffr. to SILPHA Linn., and change *Silpha* to NECROPHORUS Fabr. Fabricius was the first to divide the Linnaean

* An abridgment of his work under the name of ——Fourcroy, with binominal nomenclature, was issued in 1785, and must be taken, therefore, as the earliest date for his species.

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Silpha into two genera. The idea of type species, now commonly (though by no means universally adopted), did not then exist, and consequently it was competent for Fabricius to determine for which part of the genus he would retain the original name. If it was for the part corresponding with Geoffroy's *Peltis*, the latter must sink. Fabricius' *Necrophorus*, as will be seen in the table, is contained in *Dermestes* Geoffroy.

P. 42.—Change *Tritomidæ* to MYCETOPHAGIDÆ, and *Tritoma* to MYCETOPHAGUS Hellw., or else cite the name *Tritoma* from Fourcroy, 1785. The name in this sense should, in my opinion, be suppressed, as it was founded on a false character, and should not have been separated by Geoffroy from his *Dermestes*.

P. 79.—Change *Clerus* Geoffr. to TRICHODES Herbst., and *Thanasimus* Latr., so far as it relates to the 1st division of the genus, to CLERUS Fabr. Herbst first divided the genus as established by Geoffroy, and adopted by Fabricius, and therefore had the right to apportion the names to the divisions he founded.

P. 88.—*Stenocorus* Geoffr. The same reasoning would change this name to RHAGIUM Fabr.; the latter author having divided *Stenocorus*.

P. 51.—Change *Cistelidæ* to BYRRHIDÆ, and p. 52, *Cistela* to BYRRHUS Linn.

P. 93.—Change *Spermophagidæ* to BRUCHIDÆ, and *Mylabris* Geoffr. to BRUCHUS Linn.

P. 105.—Change *Tenebrionellus* Cr. to TENEBRIO Linn. *Tenebrio* Geoffr. is considered by Mr. Crotch to have *Asida* as its type, and therefore the change was proposed by him for the genus, as restricted by Fabricius, who first commenced its division into several genera. The same reason here applies as in several of the preceding instances.

P. 107.—Though not connected with the present subject, I may remark that the change of ULOMA to *Phaleria*, and of PHALERIA to *Halophalerus* Cr., has been produced by the assumption of generic types for the genera of authors who would certainly have repudiated the idea, had it been proposed to them. *Phaleria* Latr. was founded on three species, now belonging to different genera, and in course of time, and by the will of those who divided the genus, the 1st species has gone back to the previously established genus *Gnathocerus*, the 2nd became *Uloma* and the 3rd retained the name *Phaleria*.

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P. 108.—Change *Pseudocistela* Cr. to CISTELA Fabr.

P. 115.—Cantharis *Linn.* should read *Geoffr.* The table of synonyms of Geoffroy's genera will show that by adhering to the received code of laws of nomenclature, the name CANTHARIS *Linn.* should be restored to some genus of Telephoridae which contains Linnaean species. Of these perhaps *Podabrus* would be the most convenient, while for the blistering flies, a dismemberment of *Meloe* Linn., the name proposed by Fabricius, LYTTA, must be adopted.

Remarks of Mr. Crotch on the Genera of Geoffroy, Trans. Ent. Soc. London, 1870, 43:

"1762. Geoffroy, in his Histoire Abregee, divides the Coleoptera into 50 genera, displaying a degree of acumen far in advance of his age, which was but little appreciated by his contemporaries; the ill-concealed jealousy of Linnaeus is only too evident in his 12th edition; Olivier and Latreille succeeded in restoring the majority of Geoffroy's names, but there are still several which must be adopted. . . . *Platycerus* and *Peltis*, often attributed to Geoffroy, must either be rejected as synonyms, or, if allowed to remain, be quoted from Latreille and Illiger, who revived them. The others ought to be all retained."

Table of Synonyms of Geoffroy's Genera.

1764.	1767.	1775.	1789.	1796–1806.
GEOFFROY.	LINNÆUS.	FABRICIUS.	OLIVIER.	LATREILLE.
1. Platycerus	Lucanus	Lucanus	Lucanus Trogossita	Lucanus Trogosita Platycerus
2. Ptilinus	Ptinus	Hispa	Ptilinus Drilus	Ptilinus Drilus
3. Scarabæus	Scarabaeus	Scarabaeus Cetonia Trichius Trox Melolontha	Scarabaeus Cetonia Trox Melolontha	Scarabaeus Cetonia Trichius Trox Melolontha Aphodius Geotrupes Oryctes Hoplia
4. Copris	Scarabaeus	Scarabaeus	Copris	Copris Ateuchus

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1764.	1767.	1775.	1789.	1796–1806.
Geoffroy.	Linnæus.	Fabricius.	Olivier.	Latreille.
				Sisyphus
				Onthophagus
5. Attelabus	Hister	Hister	Hister	Hister
6. Dermestes	Dermestes	Dermestes	Dermestes	Dermestes
	Silpha	Necrophorus	Necrophorus	Necrophorus
		Tritoma	Ips	Ips
			Dryops	Dryops
		Sphaeridium	Sphaeridium	Sphaeridium
		Elophorus	Elophorus	Elophorus
		Nitidula	Nitidula	Nitidula
7. Byrrhus	Ptinus	Anobium	Anobium	Anobium
	Dermestes			
8. Anthrenus	Byrrhus	Anthrenus	Anthrenus	Anthrenus
9. Cistela	Byrrhus	Byrrhus	Byrrhus	Byrrhus
10. Peltis	Silpha	Silpha	Silpha	Silpha
				Choleva
11. Cucujus	Buprestis	Buprestis	Buprestis	Buprestis
12. Elater	Elater	Elater	Elater	Elater
				Throscus
13. Buprestis	Carabus	Carabus	Carabus	Carabus
	Cicindela	Cicindela	Cicindela	Cicindela
		Elaphrus	Elaphrus	Elaphrus
				Loricera
				Panagaeus
				Bembidium
				Harpalus
				Brachinus
				Lebia
14. Bruchus	Ptinus	Ptinus	Ptinus	Ptinus
				Gibbium
15. Lampyris	Lampyris	Lampyris	Lampyris	Lampyris
		Pyrochroa		
16. Cicindela	Cantharis	Cantharis	Telephorus	Telephorus
		Malachius	Malachius	Malachius
		Necydalis	Oedemera	Oedemera
				Dasytes
17. Omalysus			Omalisus	Omalisus
18. Hydrophilus	Dytiscus	Hydrophilus	Hydrophilus	Hydrophilus
19. Dyticus	Dytiscus	Dytiscus	Dytiscus	Dyticus
				Hyphydrus
				Haliplus
20. Gyrinus	Gyrinus	Gyrinus	Gyrinus	Gyrinus

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1764.	1767.	1775.	1789.	1796–1806.
GEOFFROY.	LINNÆUS.	FABRICIUS.	OLIVIER.	LATREILLE.
21. Melolontha	Chrysomela	Cryptocephalus	Clytra	Clythra
22. Prionus	Cerambyx	Prionus	Prionus	Prionus
23. Cerambyx	Cerambyx	Cerambyx	Cerambyx	Cerambyx
24. Leptura	Leptura	Lamia	Necydalis	Lamia
	Cerambyx	Saperda	Saperda	Cerambyx
	Necydalis	Callidium	Callidium	Prionus
25. Stenocorus	Cerambyx	Stenocorus	Stenocorus	
	Leptura	Leptura	Leptura	Leptura
		Donacia	Donacia	Donacia
		Rhagium		
26. Luperus			Luperus	
27. Cryptocephalus	Chrysomela	Cryptoceph.	Cryptoceph.	Cryptoceph.
			Eumolpus	Eumolpus
28. Crioceris	Chrysomela	Crioceris	Crioceris	Crioceris
	Hispa	Hispa	Hispa	Orsodacna
29. Altica	Chrysomela	Altica	Altica	Altica
30. Galeruca	Chrysomela	Crioceris	Galeruca	Galeruca
31. Chrysomela	Chrysomela	Chrysomela	Chrysomela	Chrysomela
				Prasocuris
32. Mylabris	Bruchus	Bruchus	Bruchus	Bruchus
33. Rhinomacer	Attelabus	Attelabus	Attelabus	Attelabus
			Rhynchites	Rhynchites
			Apion	Apion
			Apoderus	
34. Curculio	Curculio	Curculio	Curculio	Curculio
				Calandra
				Brachyrhinus
				Lixus
				Cionus
35. Bostrichus	Dermestes	Bostrichus	Bostrichus	Bostrichus
				Anthribus
36. Clerus	Dermestes	Clerus	Clerus	Clerus
	Attelabus	Notoxus	Necrobia	Necrobia
		Dermestes		Thanasimus
				Opilus
				Anthribus
37. Anthribus	Dermestes	Curculio	Anthribus	Anthribus
		Bruchus	Macrocephalus	
38. Scolytus		Bostrichus	Scolytus	Scolytus
39. Cassida	Cassida	Cassida	Cassida	Cassida
40. Anaspis	Mordella		Mordella	Anaspis
41. Coccinella	Coccinella	Coccinella	Coccinella	Coccinella

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1764.	1767.	1775.	1789.	1796–1806.
GEOFFROY.	LINNÆUS.	FABRICIUS.	OLIVIER.	LATREILLE.
42. Tritoma	Chrysomela		Mycetophagus	Mycetophagus
43. Diaperis	Chrysomela	Chrysomela	Diaperis	Diaperis
44. Pyrochroa	Lampyris Cantharis	Pyrochroa	Pyrochroa	Pyrochroa
45. Cantharis	Meloe Necydalis	Lytta Necydalis	Cantharis Oedemera Lagria	Cantharis Oedemera Lagria Sitaris
46. Tenebrio	Tenebrio Silpha	Tenebrio Opatrum Blaps Helops Cistela	Tenebrio Opatrum Blaps Helops Cistela	Tenebrio Opatrum Blaps Helops Cistela Asida Pedinus
47. Mordella	Mordella	Mordella	Mordella Cistela	Mordella Cistela
48. Notoxus	Meloe	Notoxus	Notoxus	Notoxus
49. Cerocoma	Meloe	Cerocoma	Cerocoma	Cerocoma
50. Staphylinus	Staphylinus	Staphylinus Paederus Oxyporus	Staphylinus Paederus Oxyporus	Staphylinus Paederus Oxyporus
51. Necydalis	Cantharis	Cantharis	Telephorus	Malthinus
52. Meloe	Meloe	Meloe	Meloe	Meloe

Notes to Table of Synonyms:

1, Trogosita *Fabr.;* 3, Geotrupes *Fabr.;* 4, Ateuchus Fabr.; 6, Lyctus *Fabr.;* Parnus *Fabr.;* Dryops *Latr.;* 7, Dermestes *Fabr.;* 13, Brachinus *Fabr., Weber;* 15, Lycus *Fabr.;* 16, Telephorus *Schæffer*, 1766; Dasytes *Fabr.;* 17, Omalysus *Fabr.;* 19, Hydrachna *Fabr.;* 21, Clytra *Laicharting*, 1781; 24, Prionus *Fabr.;* 26, Crioceris *Fabr.;* Ptinus *Fabr.*, 27, Eumolpus *Fabr.;* 28, Lema *Fabr.;* 29, adopted by Fabr. in Syst. Ent., 1775; transferred to Galleruca in Ent. Syst., 1792; some of the species also under Crioceris and Chrysomela; 30, Galleruca *Fabr.;* 32, the name Bruchus was adopted by Linnaeus from Kalm.; 34, Lixus and Calandra *Fabr.;* 35, Fabricius referred *capucinus* to Bostrichus in 1775, but in 1792 transferred it to Apate; 36, Clerus *Latr.*=Trichodes *Herbst, Fabr.;* 38, Eccoptogaster *Herbst.;* 40, Mordella *Fabr.;* 42, Ips *Fabr.*, Mycetophagus *Fabr.;* 43,

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Diaperis, Hispa *Fabr.;* 45, Lagria *Fabr.;* 48, Notoxus *Fabr.*, 1782, Anthicus *Fabr.*, 1801 ; 50, several of Gravenhorst's genera, also adopted by Latreille.

These notes are not intended to give in all instances the authority by whom the additional names of genera were first proposed, but only to show their use by the authors quoted.

Table of Homonyms of Geoffroy's Genera, with their Reference to Modern Families :

1. Platycerus ; Lucanide. Lucanide (*Latr.*)
2. Ptilinus ; Ptinide. Ptinide (*Oliv., Latr.*)
3. Scarabaeus; Scarabaeide. Scarabaeide (*Linn., &c.*)
4. Copris ; Scarabaeide. Scarabaeide (*Oliv., Latr.*)
5. Attelabus ; Histeride. Curculionide (Linn., &c.)
6. Dermestes ; Dermestide. Dermestide (Linn., &c.)
7. Byrrhus ; Ptinide. Byrrhide (Linn., &c.)
8. Anthrenus ; Dermestide. Dermestide (*Fabr., Oliv., Latr.*)
9. Cistela ; Byrrhide. Cistelide (*Fabr., Oliv., Latr.*)
10. Peltis ; Silphide. Trogositide. (")
11. Cucujus ; Buprestide. Cucujide. (")
12. Elater ; Elateride. Elateride (*Linn., &c.*)
13. Buprestis ; Carabide. Buprestide (*Linn., &c.*)
14. Bruchus ; Ptinide. Bruchide (*Linn, &c.*)
15. Lampyris ; Lampyride. Lampyride (*Linn., &c.*)
16. Cicindela ; Telephoride. Cicindelide (*Linn., &c.*)
17. Omalysus ; Lycide. Lycide (*Oliv., Latr.*)
18. Hydrophilus ; Hydrophilide. Hydrophilide (*Fabr., Oliv., Latr.*)
19. Dytiscus ; Dytiscide. Dytiscide (*Linn., &c.*)
20. Gyrinus ; Gyrinide. Gyrinide (*Linn. &c.*)
21. Melolontha ; Chrysomelide. Scarabaeide (*Fabr., Oliv., Latr.*)
22. Prionus ; Cerambycide. Cerambycide (*Fabr., Oliv., Latr.*)
23. Cerambyx ; Cerambycide. Cerambycide (*Linn., &c.*)
24. Læptura ; Cerambycide. Cerambycide (*Linn., &c.*)
25. Stenocorus ; Cerambycide. Cerambycide (*Fabr., Oliv., Latr.*)
26. Luperus ; Chrysomelide. Chrysomelide (*Oliv.*)
27. Cryptocephalus ; Chrysomelide. Chrysomelide (*Fabr., Oliv., Latr.*)

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28. Crioceris; Chrysomelide. Chrysomelide (*Fabr.*, *Oliv.*, *Latr.*)
29. Altica; Chrysomelide. Chrysomelide (*Fabr.*, *Oliv.*, *Latr.*)
30. Galeruca; Chrysomelide. Chrysomelide (*Oliv.*, *Latr.*, *Fabr.*)
31. Chrysomela; Chrysomelide. Chrysomelide (*Linn.*, *&c.*)
32. Mylabris; Bruchide. Meloide (*Fabr.*, *Oliv.*, *Latr.*)
33. Rhinomacer; Attelabide. Rhinomaceride (*Latr.*)
34. Curculio; Curculionide. Curculionide (*Linn.*, *&c.*)
35. Bostrichus; Bostrichide. Bostrichide (*Oliv.*, *Latr.*) Scolytide (*Fabr.*)
36. Clerus; Cleride. Cleride (*Fabr.*, *Oliv.*, *Latr.*)
37. Anthribus; Anthribide. Anthribide, *Oliv.*, *Latr.*
38. Scolytus; Scolytide. Scolytide (*Oliv.*, *Latr.*) Carabide, *Fabr.*
39. Cassida; Chrysomelide. Chrysomelide (*Linn.*, *&c.*)
40. Anaspis; Mordellide. Mordellide (*Latr.*)
41. Coccinella; Coccinellide. Coccinellide (*Linn.*, *&c.*)
42. Tritoma; Mycetophagide. Erotylide (*Fabr.*, *&c.*)
43. Diaperis; Tenebrionide. Tenebrionide (*Oliv.*, *Latr.*)
44. Pyrochroa; Pyrochroide. Pyrochroide (*Fabr.*, *Oliv.*, *Latr.*)
45. Cantharis; Meloide. Meloide (*Oliv.*, *Latr.*) Telephoride (*Linn.*, *Fabr.*)
46. Tenebrio; Tenebrionide. Tenebrionide (*Linn.*, *&c.*)
47. Mordella; Mordellide. Mordellide (*Linn.*, *&c.*)
48. Notoxus; Anthicide (*Fabr.*, *Oliv*, *Latr.*) Cleride, *Fabr.*
49. Cerocoma; Meloide. Meloide (*Fabr.*, *Oliv.*, *Latr.*)
50. Staphylinus; Staphylinide. Staphylinide (*Linn.*, *&c.*)
51. Necydalis; Telephoride. Cerambycide (*Linn.*, *Oliv.*, *Fabr.*) Oedemeride (*Fabr.*)
52. Meloe; Meloide. Meloide (*Linn.*, *&c.*)

DISCREPANCIES IN RECENT LISTS OF LEPIDOPTERA.

BY W. F. KIRBY, ENGLAND.

The opponents of the law of priority in nomenclature have taken occasion, both in England and America, to argue against the restoration of obsolete names, on the ground that the names employed in my Catalogue of Diurnal Lepidoptera do not always harmonize with those used in Staudinger's Catalogue of European Lepidoptera. Although this

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argument looks plausible at first sight, a little reflection will probably convince many that it is baseless. We may leave genera out of the question now, as Staudinger has not attempted to grapple with the difficulties which they present; but as regards species, it must be remembered—1st, that Staudinger starts from 1758, instead of 1767, and that I should have done the same had I investigated the question fully when I commenced my work; and 2nd, that Staudinger, working at European Lepidoptera only, was necessarily better acquainted with the special literature relating to them than myself. Had I selected 1758, and possessed Werneburg's Beitrage zur Schmetterlings kunde at the time I was writing my own Catalogue, or had Staudinger's new Catalogue been published in time for me to verify the references contained in it, I think I may say that many of the alleged discrepancies would have disappeared, although, in some cases, I may have made use of materials which Staudinger does not appear to have employed, or may have seen reason to disagree with him as to the determination of certain species. Unless two authors have exactly the same materials to work with, or one copies from the other, no rules will be sufficient to insure their absolute agreement in *every* case; but by the strict law of priority, the chances of disagreement are reduced to a minimum.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 170.)

ANTISPILA.

A. ampelopsisella. N. sp.

In the preceding paper on this genus I mentioned that I had found the larva of this species mining the leaves of *Ampelopsis quinquefolia.* Since that paper was placed in the hands of the Editor, many months ago, I have succeeded in rearing it from the mine.*

* The specimen mentioned in that paper as having been bred from the Longworth grape-vine, is now too much denuded for satisfactory comparison with this species, but I believe it to be the same; certainly it is not any of the other known American species, and I have never met with it except in the Longworth grape leaf.

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It is much smaller than any of the previously described species of this country, measuring only $\frac{3}{16}$ of an inch *alar ex.*, whilst *cornifoliella* is larger $\frac{1}{4}$, *Isabella* a little larger still, and *Viticordifoliella* is scant $\frac{1}{4}$. But it differs still more decidedly by having an almost lunate, rather large snow-white streak extending along the base of the dorsal ciliae nearly to the apex.

The distinctions between the described American species are as follows: The fascia and dorsal spot in *isabella* are wider than in *cornifoliella*. *Isabella* has the palpi white and the anterior feet yellowish, with brown annulations. Dr. Clemens is in error when he says that it is without violet and greenish reflections; I find it shows them about as in *cornifoliella*. In all the species I should call the fascia silvery rather than golden, though it certainly is tinged with golden. *Isabella* has the antennæ brown, with faint purplish reflections in some lights; the basal joint is pale ochreous yellow, but the terminal joint is of the general hue. In *cornifoliella* the stalk appears a little darker, and the terminal joint is white. The head in *isabella* can scarcely be said to be golden, as Dr. Clemens describes it, but has metallic hues; it appears to be like the fascia, silvery tinged with golden, though in some lights it appears to be brown. I have not been able to detect any appreciable differences between the fore feet of these two species. The face of *cornifoliella* is more decidedly brown and less metallic than that of *isabella*, and the palpi are somewhat darker.

The most striking differences are in the size and form of the fascia. *Viticordifoliella* differs from both *isabella* and *cornifoliella* in the fascia, which, however, resembles that of *isabella*, except that it is narrower on the costa. The costal and dorsal white spots in *viticordifoliella* are much more nearly regular triangles than in the other two species, in which they approach the trapezoidal form, and the costal spot is relatively smaller than the dorsal and a little further back, but the most striking difference is that the wings of *viticordifoliella* are more of a dead brown hue, the violet and bronzy green reflections being much less distinct. Its anterior tarsi are silvery white, and the head and palpi silvery tinged with yellowish. *Ampelopsiella* has the palpi white; face and head silvery, the face with a blue tinge; antennæ dark purple brown, with the tip white; fascia much as in *cornifoliella;* costal and dorsal spots rather as in *viticordifoliella*, but its most distinguishing mark is the curved white spot or streak along the dorsal ciliæ.

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ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The annual meeting of the above society was held (by the kind permission of the Provost) in the library of Trinity College, Toronto, on the 23rd of September, at 3 : 30, p. m. The report of the Secretary-Treasurer was presented, showing a slight increase of membership and a satisfactory condition of the finances, after which the President read his annual address, which was, by request of those present, kindly placed at the disposal of the Printing Committee for publication.

The following officers were then elected :—

President, Rev'd C. J. S. Bethune, M. A., Port Hope ; Vice-President, R. V. Rogers, Kingston ; Secretary-Treasurer, J. H. McMechan, London ; Council—E. Baynes Reed, W. Saunders, Rev'd G. M. Innes, J. M. Denton, London ; G. J. Bowles. Montreal. Editor of ENTOMOLOGIST, W. Saunders. Editing Committee—Rev'd C. J. S. Bethune, M. A.; E. Baynes Reed ; J. G. Bowles. Library Committee—W. Saunders, E. Baynes Reed, J. H. McMechan. Auditors—Chas. Chapman and J. H. Griffiths, London.

CORRESPONDENCE.

BRIEF NOTICE OF MR. STRECKER'S LAST ISSUE (NO. 10.)

The number bears the date of May, but its issue is certainly later, copies having been sent to subscribers in August ; its exact date is therefore uncertain. It contains brief descriptions of some supposed new species of moths, besides its curious account of North American Lycænæ, and pretty plate. The description of *Macroglossa fumosa* is in so far objectionable as Mr. Strecker is ignorant that all the allied species have, on emerging from the pupa, a light clothing of scales on the pellucid portion of the wings (see Ann. N. Y. Lyc., Vol. 8, and Lintner's N. Y. State Reports) which is easily brushed off.

Sphinx eremitoides is very probably *S. lugens* Walk.

Catocala magdalena is *C. illecta* Walk. (my No. 37).

Catocala aspasia is apparently *C. Arizonæ*, the description, so far as it goes, corresponding, with allowances for Mr. Strecker's "scarlet" hind wings.

A. R. GROTE.

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PURCHASE OF INSECTS.—It often happens that an Entomologist is at a loss to procure specimens of certain rare species that he desires for purposes of study or to complete a series in his cabinet; he has seen them, perhaps, in the collection of a friend, or read of them in some publication, but is unable to obtain them for himself. We are glad to find that a provision has been made for such cases by the establishment of the "Philadelphia Agency" for the sale of specimens of insects; it is under the management of Mr. J. H. Ridings (518 South 13th Street,) and is evidently in close connection with the American Entomological Society. The Agency not only sells to purchasers, issuing price-lists of species from time to time, but also receives and disposes of collections from individuals upon commission. The names, moreover, of all insects sold by the Agency are guaranteed to be correct. We would recommend any of our friends who desire to procure rare and beautiful specimens, to send to the Agency for a price-list.

BOOKS RECEIVED.

On the Noctuidæ of North America, by Aug. R. Grote; from the 6th Report of the Peabody Academy of Science, Salem, Mass., 1874, pp. 18.

Descriptions of New North American Phalænidæ and Phyllopoda, by A. S. Packard, jr., ibid, pp. 19.

On the Transformations of the Common House Fly, with notes on allied forms, by A. S. Packard, jr. M. D.; from Proc Boston Soc. Nat. Hist., Feb., 1874, pp. 16, one plate.

Bulletin of the Buffalo Society of Nat. Sciences, Vol. ii, Nos. 1, 2 and 3.

Proceedings of the Boston Society of Natural History, vol. xvi, part iii, Jan. & Feb., part iv, Feb. to April, 1874.

Report of the Department of Agriculture, Washington, June to October.

Proceedings of the Convention of the American Association of Breeders of Short Horns.

Proceedings of the Academy of Natural Sciences of Philadelphia, October—December, 1873, and Jan., Feb. and March, 1874.

Report of the Council of the Agricultural and Arts Association of Ontario for 1873; Prize List of do. for 1874.

Additions to the Library of the Linnæan Society, London, Eng., pp. 25.

The Observer of Nature, Lawrence, Kansas, vol. i, Nos. 1 and 2.

Entomology in Missouri, by Prof. C. V. Riley, from the American Naturalist, March and April, 1874, pp. 10.

The Zoologist and Newman's Entomologist, May to September; from Mr. Reeks.

Science Gossip to September.

Nature to Oct. 1.

The Horticulturist, N. Y., to Aug.

The American Agriculturist to July.

The Prairie Farmer, Chicago.

The Canada Farmer, Toronto, to July 15.

The Maine Farmer, Augusta, Me.

The Journal of Education, Toronto, to July.

The Indiana Farmer, Indianapolis.

Le Naturaliste Canadien, Quebec, to July.

Journal of Education to Sept., 1874.

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The Canadian Entomologist.

VOL. VI. LONDON, ONT., NOVEMBER, 1874. No. 11

ON ENTOMOLOGICAL NOMENCLATURE.

BY JOHN L. LECONTE, M. D., PHILADELPHIA.

Part I—On the Law of Priority.

Im Ganzen—haltet euch an Worte ! GOETHE.*

The discussions upon the subject of nomenclature in Zoology, and especially in the department of Entomology, have recently become very perplexing to American students. Many who have been unable either by want of time or lack of opportunity, to consult old works, which are to be found in but few libraries, are called upon suddenly to decide for themselves, whether they will or will not adopt changes in the names of some of the most familiar and best known objects.

To all such I have but two words of advice : *Resist innovation*, unless the innovator presents to you the reasons for his proposed change, with such force as to convince your judgment. Disregard the Mephistophelean counsel, in the motto above cited. Use the *words* only to acquire and convey accurately your knowledge of *things ;* but never believe that the word is superior to the thing which it represents. Thus will you avoid scholasticism, one of the great abysses of thought into which the seeker after truth is liable to fall.

With a view to guide the thoughts of those of my readers who have paid heretofore but little attention to this very troublesome subject, in such manner that they may be able to form independent opinions, I have endeavored in this essay to place briefly before them the canons upon which all action in regard to nomenclature are at the present time supposed to be based. And to these canons I have appended short

* *On words* let your attention centre. B. Taylor's Faust, i, 110.

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commentaries on the method in which I think they should be executed, in order that we may arrive at permanent and unchangeable results. These canons, as I would express them, are as follows:

1. The binominal system of nomenclature is the only one to be recognized: one word for the genus, and another for the species, to indicate each object.

2. Linnæus was the author of the binominal system.

3. The law of priority must be adhered to, so far as the interests of science make it practicable.

This law renders inviolable the name of every species which has been properly published, and the name of every genus properly defined and exemplified by one or more species.

4. The great number of the organic beings subjected to study has made it necessary, in order to avoid confusion, to increase the binominal name by adding the authority upon which the name either in whole or part rests.

5. In the formation of new names, reference is to be had to classical construction and to the ordinary proprieties of social intercourse.

Since the binominal system is of modern invention, being indeed scarcely more than a century old, and was only gradually introduced even by its author, it is obvious that none of these fundamental canons existed in the minds of the founders of Zoology, and that the appreciation of the necessity of such ordinances has become apparent only in consequence of the confusion occasioned by their non-existence.

The old codes of rules, Philosophia Botanica of Linnæus, and its imitation, Philosophia Entomologica of Fabricius, do not cover many of the most perplexing cases which have since arisen under these four rules, although, if acted on in good faith, they would have prevented much of the confusion since produced.

Concerning the two old codes I have at present nothing to say, the exhaustive commentary on the rules of Linnæus in the introduction to the Nomenclator Zoologicus of Agassiz, leaving, in fact, nothing to be desired.

It is therefore apparent that in applying the four canons, their influence must, like all retro-active laws, commence at certain arbitrary periods, to be determined, not by the judgment of individual investigators, but by

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the same authority which fixes the principles themselves, that is: the common consent, expressed in a more or less formal manner, of the majority of those engaged in systematic study relating to the improvement of classification.

Now, the 1st and 2nd canons have been already put in execution by the rule adopted by the British Association, and reaffirmed by the Association of American Naturalists and Geologists, as follows:

"Rule III. The Committee are of opinion, after much deliberation, that the XIIth edition of the Systema Naturæ is that to which the limit of time should apply, viz., 1766."

This rule was adopted after much discussion regarding the respective claims of the 10th and the 12th edition to be considered as the basis of the system, and I think for wise and sufficient reasons. However that may be, there is no room now for individual difference of action; it is a law, and must be obeyed by all good citizens in the Republic of Science, until modified or abrogated by an authority equal to that which enacted it.

The third canon respecting the law of priority is also formulated in several rules of the British and American code, but in such manner as to render its application somewhat difficult. The following considerations seem to me of sufficient importance to require a definite decision, when the next opportunity occurs for formal action.

1. It is obvious, on an examination of the works of the earlier authors in Entomology, that they did not attach the same value to the fixity of nomenclature that circumstances have since rendered necessary. Linnæus changed apparently without cause several of the specific names from the 10th to the 12th edition. Previous to that time, he used the generic names in different senses, in different editions, without any explanations. Geoffroy described genera without reference to genera previously established by Linnæus. Fabricius did the same with regard to Geoffroy, and also in some instances changed his genera from 1775 to 1787, without reason, or even reference to the earlier name.

It is not until we come to Olivier that we find in Entomology the law of priority appearing; and not then as a matter of principle, so much as a courtesy due to the earlier describer.

I would therefore respectfully submit, 1st, that a rigorous application of the law of priority to those authors who did not act in accordance with it, will lead to much confusion; and it would probably be better, in all

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doubtful cases, to restrict its operation to the time since the commencement of Olivier's part of the Encyclopedie Methodique, and to accept his decision as final on all cases up to that time, in the same way that the 12th edition of Linnæus is accepted as final on the question of binominal nomenclature.

2. If the authors anterior to the 12th edition are ruled out because of the imperfection of the binominal method up to that time, it would surely be consistent to exclude those after that time who failed to recognize its necessity. Species cannot, of course, be cited from them, for they gave no specific names; but I will go farther, and say that genera ought not to be attributed to them, except so far as to quote them in synonymy for their generic ideas, which were brought into harmony with the system of nomenclature by subsequent authors. They will live in the literature of the science in synonymy, but they have taken no part in the formation of the names of the objects, by which alone we know them and can speak of them, and therefore should not appear as authorities.

The proper application of the fourth canon is attended with still greater difficulty, and I fear that the two sets of opinions regarding the authority to be placed after the binominal name are absolutely irreconcilable. The arguments in favor of the original describer of the species on the one hand, and of the author of the binominal combination adopted on the other hand, are equally strong, perhaps, as regards the convenience of science, and each side has been argued with the utmost ability. I have therefore nothing to say on the subject in the way of argument, and suspect that for some time it must be left to the discretion of each student to decide under which system he can work best. Practically I do not regard it as a matter of any consequence, if each person will *distinctly declare* in his work *which system* he uses. The number of instances in which any confusion can result are few, and the synonymy in catalogues which are always at hand will at once resolve the doubt.

I may be permitted to observe, however, that clearer views of the respective merits of the two methods would prevail, and possibly even some harmonious result more speedily be obtained, if the arguments involved less discussion of purely personal interests. It would seem from some expressions of opinion I have seen, but which I forbear to refer to more definitely, that there are those that believe that one main object of descriptive natural history is to give the authors a sort of proprietary

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interest in the species to which they affix names. The two methods of reference to authors would lead, therefore, on the one hand, to hasty and vague descriptions of species, on the other to arbitrary and unnecessary changes in genera. Such ideas are really aspersions on the motives of the great professors of unremunerative labor, upon whom science chiefly depends for her advancement. The good and true laborers are many; the small and mean minds, who feel honored at being quoted even in synonymy, are few. I think, therefore, that the harm to be done by adhering to either of the two methods is greatly exaggerated.

I would prefer to believe that the somewhat passionate line of argument occasionally indulged in, arises rather from a mental fault which is too common in this age, which prevails in all classes and in all pursuits —the undue importance given to the claiming of supposed rights, over the performance of fixed and definite duties. Of clamor for rights, even in countries where there is no oppressing class, we hear a great deal; of appeals for the rigid keeping of obligations we hear very little.

It is the privilege, with the facilities for publication now afforded by learned societies, of every careful observer of nature to contribute valuable material for the progress of the branch of science which he is capable of cultivating. *It is his duty* to put his contributions to knowledge in such a form as to be most easily available to his brothers in science. Whether his name remains connected permanently with his observation or not is a matter of small importance; he has done his duty in increasing the power of work of his colleagues.

In this connection I would observe that it is only in descriptive Natural History, the lowest and most routine work that a man of science has to perform, that any association of names with results is possible. In all other and higher departments of knowledge, such as Newton with gravitation, Young with light, Franklin with atmospheric electricity, Faraday, Henry, Arago, Ampere and Jacobi with dynamical electricity, Agassiz with glacial action; or, to exemplify from our own departments, Linnæus, Jussieu, Cuvier and Geoffroy, all these men are historically eminent for their labors, far more than for attaching their names to the objects of their study. With such examples of high and honest effort, to be imitated by us in proportion to our respective abilities, it is surely an ignoble ambition, and certainly an uncommon one, that would aim at distinction by having the name printed in association with a weed, or a bug, or a bone.

The multitude of new objects is the great curse of Natural History at the present time. When they are nearly all described and named, so

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that they may be recognized, a period of more rapid and healthy progress will commence. The attention of the lovers of nature will then be free to observe the habits and to study more minutely the structure of the different species. Classification and economic science will advance together to the perfection which will reward the future students.

One more subject remains to be treated, and I have done. It is one that I approach with hesitation, and even with pain. The recommendations contained in the British American Code, for the future guidance of naturalists in respect to nomenclature, are carefully drawn,and if faithfully and prudently regarded, would leave nothing to be desired.

Unfortunately, under the influence of personal peculiarities, the excitement of political struggles, or the uncongeniality of religious associations, the contributors to scientific literature are sometimes led to forget the laws of good breeding, which are binding upon all civilized men, and should be particularly so upon those addicted to so noble a pursuit as the study of nature.

Under these exaltations of brain, names are sometimes proposed which are offensive* in the highest degree. It is useless to reason with such persons on the impropriety of their conduct, or the irrelevancy of proclaiming opinions which have no place in science, for their minds are occluded against all such appeals to their better nature. What shall be done with such names? It is a question which concerns not only the systematist, but every collector, every writer, indeed, who may have occasion to use an illustration from Natural History. I therefore invite the fullest and most democratic expression of opinion.

INSECTS AND FLOWERS.—I have observed this spring that the bees extract honey from the flowers of the *Wisteria* by drilling a hole through the calyx. I have seen the big bumble-bees drilling the holes, and the honey-bees making use of these holes. Whether the latter have strength to bore the holes I am not sure; but it is curious that they should not treat the honeysuckle in the same way. It would be easier to pierce the corolla of that flower than the tough calyx of *Wisteria*, and it would yield a more abundant supply of nectar. No doubt there is some reason why they do not, and perhaps you can inform me what it is.—*C. T. in Science Gossip.*

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* [The author here evidently alludes to such names as Pleocoma Staff, Eudaemonia Jehovah and others of the same nature.]

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ON THE INSECTS MORE PARTICULARLY ASSOCIATED WITH SARRACENIA VARIOLARIS *(Spotted Trumpet-Leaf.)**

BY CHAS. V. RILEY, ST. LOUIS, MO.

The insect-catching powers of those curious plants, the Fly-traps (*Dionæa*), the Sun-dews (*Drosera*) and the Trumpet-leaves (*Sarracenia*) have always attracted the attention of the curious, but renewed interest has been awakened in them by virtue of the interesting experiments and observations on their structure, habit and function, that have lately been recorded, and especially by the summing up of these observations in some charming papers by Prof. Asa Gray, which recently appeared in *The Nation* and *The New York Tribune*, under the title of "Insectivorous Plants."

Through the courtesy of Dr. J. H. Mellichamp, of Bluffton, and of H. W. Ravenel, of Aiken, S. C., who have sent me abundant material, I am able to submit the following notes of an entomological bearing, on the Spotted Trumpet-leaf (*Sarracenia variolaris*), which must henceforth rank with the plants of the other genera mentioned as a consummate insect catcher and devourer.

The leaf of Sarracenia is, briefly, a trumpet-shaped tube, with an arched lid, covering, more or less completely, the mouth. The inner surface, from the mouth to about midway down the funnel, is covered with a compact, decurved pubescence, which is perfectly smooth and velvety to the touch, especially as the finger passes downward. From midway it is beset with retrorse bristles, which gradually increase in size till within a short distance of the bottom, where they suddenly cease, and the surface is smooth. There are also similar bristles under the lid. Running up the front of the trumpet is a broad wing with a hardened or ventral side border, parting at the top and extending around the rim. Along this border, as Dr. Mellichamp discovered, but especially for a short distance inside the mouth, and less conspicuously inside the lid, there exude drops of a sweetened, viscid fluid, which, as the leaf matures, is replaced by a white, papery, tasteless, or but slightly sweetened sediment or efflorescence; while at the smooth bottom of the pitcher is secreted a limpid fluid possessing toxic or inebriating qualities.

* Read before the American Association for the Advancement of Science, at the late meeting at Hartford.

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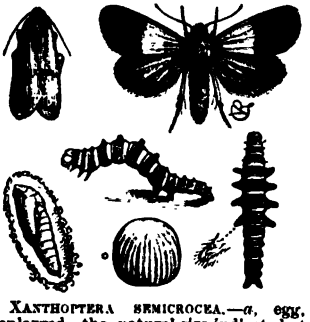
The insects which meet their death in this fluid are numerous and of all orders. Ants are the principal victims, and the acidulous properties which their decomposing bodies give to the liquid doubtless render it all the more potent as a solvent. Scarcely any other Hymenoptera are found in the rotting mass, and it is an interesting fact that Dr. Mellichamp never found the little nectar-loving bee or other Mellifera about the plants. On one occasion only have I found in the pitcher the recognizable remains of a *Bombus*, and on one occasion only has he found the honey-bee captured. Species belonging to all the other orders are captured, and among the larger species that I have most commonly met with, which, from the toughness of their chitinous integument, resist disorganization and remain recognizable, may be mentioned *Asaphes memnonius* and *Euryomia melancholica* among Coleoptera, *Pentatoma lugens* and *Orsilochus variabilis*, var. *complicatus* among Heteroptera; while katydids, locusts, crickets, cockroaches, flies, moths, and even butterflies, and some Arachidna and Myriapoda, in a more or less irrecognizable condition, frequently help to swell the unsavory mass.

But while these insects are decoyed and macerated in order, as we may naturally infer, to help support the destroyer, there are, nevertheless, two species which are proof against its siren influences and which, in turn, oblige it either directly or indirectly to support them.

The first is *Xanthoptera semicrocea* Guen., a little glossy moth, which may be popularly called the Sarracenia moth. It is strikingly marked with gray-black and straw-yellow, the colors being sharply separated across the shoulders and the middle of the front wings. This little moth walks with perfect impunity over the inner surface of the pitcher, which proves so treacherous to so many other insects. It is frequently found in pairs within the pitchers soon after these open, in the early part of the season or about the end of April. The female lays her eggs singly, near the mouth of the pitcher, and the young larva, from the moment of hatching, spins for itself a carpet of silk, and very soon closes up the mouth by drawing the rims together and covering them with a delicate, gossamer-like web, which effectually debars all small outside intruders. It then frets the leaf

Fig. 25.



XANTHOPTERA SEMICROCEA.—*a*, egg, enlarged, the natural size indicated at side; *b*, *c*, larva, back and side views; *d*, chrysalis; *e*, moth, normal form, with wings expanded; *f*, pale variety, with wings closed.

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within, commencing under the hood and feeding downward on the cellular tissue, leaving only the epidermis. As it proceeds, the lower part of the pitcher above the putrescent insect collection becomes packed with ochreous excrementitious droppings, and by the time the worm has attained its full size the pitcher above these droppings generally collapses. This worm, when full grown, is beautifully banded transversely with white and purple or lake red, which Dr. Mellichamp poetically likens in brightness to the Tyrian dye. It is furthermore characterized by rows of tubercles, which are especially prominent on the four larger legless joints. It is a half looper, having but six prolegs, and keeps up, in travelling, a constant, restless, wavering motion of the head and thoracic joints, recalling *paralysis agitans*. The chrysalis is formed in a very slight cocoon, usually just above or within the packed excrement. The species, kindly determined by Mr. A. R. Grote, was many years ago figured by Abbot, who found it feeding on *Sarracenia variolaris*, in Georgia. Guenée's descriptions were made from these figures, for which reason I have made some descriptive notes from the living material.* The species feeds alike on *S. variolaris* and *S. flava*, and there are at least two broods each year, the first brood of larvæ being found during the early part of May, the second toward the end of June, and disappearing with the dying of the leaves.

The second species is a still more invariable living accompaniment of both kinds of Sarracenia mentioned. By the time the whitish efflorescence shows around the mouth of the pitcher, the moist and macerated insect remains at the bottom will be found to almost invariably contain a single whitish, legless grub or "gentle," about as large round as a goosequill, tapering to the retractile head, which is furnished with two curved, black, sharp hooks, truncated and concave at the posterior end of the body.

Fig. 26.

SARCOPHAGA SARRACENIÆ.—*a*, larva; *b*, pupa; *c*, fly, the hair lines showing average natural lengths; *d*, enlarged head and first joint of larva, showing curved hooks, lower lip (*g*), and prothoracic spiracle; *e*, end of body of same, showing stigmata (*f*) and prolegs and vent; *h*, tarsal claws of fly with protecting pads; *i*, antenna of same. All enlarged.

This worm riots in the putrid insect remains, and when fed upon them to repletion, bores through the leaf just above the petiole and burrows

* These will be found in the Transactions of the St. Louis Academy of Science.

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into the ground. Here it contracts to the pupa state, and in a few days issues as a large two-winged fly, which I have described (*loc. cit.*) as *Sarcophaga sarraceniæ*—the Sarracenia Flesh-fly.

The immense prolificacy of the flesh-flies, and the fact that the young are hatched in the ovaries of the parent before they are deposited by her on tainted meat and other decomposing or strong-smelling substances, have long been known to entomologists, as has also the rapid development of the species. The viviparous habit among the Muscidæ is far more common than is generally supposed, and I have even known it to occur with the common house-fly, which normally lays eggs. It is also possessed by some Œstridæ, as I have shown in treating of *Œstrus ovis*, the Sheep Bot-fly,*

But the propensity of the larvæ for killing one another, and their ability to adapt themselves to different conditions of food supply are not sufficiently appreciated. I have long since known, from extensive rearing of parasitic Tachinidæ, that when, as is often the case, a half dozen or more eggs are fastened to some caterpillar victim only large enough to nourish one to maturity, that they all hatch and commence upon their common prey, but that the weaker eventually succumb to the strongest and oldest one, which finds the juices of his less fortunate brethren as much to his taste as those of the victimized caterpillar. Or, again, that where the food supply is limited in quantity, as it often is and must be with insects whose larvæ are parasitic or sarcophagus, such larvae have a far greater power of adapting themselves to the conditions in which they find themselves placed, than have herbivorous species under like circumstances.

Both these characteristics are strongly illustrated in *Sarcophaga sarraceniæ*. Several larvae, and often upward of a dozen, are generally dropped by the parent fly within the pitcher; yet a fratricidal warfare is waged until usually but one matures, even where there appears macerated food enough for several. And if the Xanthoptera larva closes up the mouth of the pitcher ere a sufficient supply of insects have been captured to properly nourish it, this Sarcophaga larva will nevertheless undergo its transformations, though it sometimes has not strength enough to bore its way out, and the diminutive fly escapes from the puparium, only to find itself a prisoner unless deliverance comes in the rupture or perforation of the pitcher by the moth larva or by other means. This rupturing of the

* 1st Mo., Ent. Rep., p. 165.

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pitcher does not unfrequently take place, for Dr. Mellichamp writes under date of June 27, as follows: "Most old leaves now examined—I might almost say all—instead of being bored, seem ripped or torn, as if by violence, apparently from without. You see occasionally shreds of the leaf hanging. Surely the legless larva of Sarcophaga cannot do this! What then—toads, or frogs, or crawfish abounding in these moist, pine lands? or rather is not the fat maggot the occasion of the visits of the quail, which lately I have observed here?"

These two insects are the only species of any size that can invade the death-dealing trap with impunity while the leaf is in full vigor, and the only other species which seem at home in the leaf are a minute pale mite belonging apparently to *Holothyrus* in the Gamasidæ, and which may quite commonly be found crawling within the pitcher; and a small Lepidopterous leaf-miner, which I have not succeeded in rearing. There must, however, be a fifth species, which effectually braves the dangers of the bottom of the pit, for the pupa of Sarcophaga is sometimes crowded with a little Chalcid parasite, the parent of which must have sought her victim while it was rioting there as larva.

No other insect, so far as we now know, can crawl up the slippery belt, but tumble into the tube and there meet their death.

Certain questions very naturally present themselves here: First, What gives the flesh-fly more secure foothold on the slippery pubescence than the common house-fly exhibits? Second, What enables the larva of the flesh-fly to withstand the solvent property of the fluid which destroys so many other insects? Third, What gives the Sarracenia moth and its larva similar security? I can only offer, in answer, the following suggestions: The last joint of the tarsus of the common house-fly has two movable, sharp-pointed claws, and a pair of pads or "pulvilli." These pads were formerly supposed to operate as suckers, and all sorts of sensational accounts of this wonderful sucker have been given by popular writers, who forgot that there are any number of minute insects having no such tarsal apparatus, which are equally indifferent to the laws of gravitation so far as walking on smooth, upright surfaces, or on the ceiling, is concerned. In reality, these pads are thickly beset on the lower surface with short hairs, most of which terminate in a minute expansion kept continually moist by an exuding fluid—a sort of perspiration. Take the soft human hand, moistened by perspiration or other means, and draw it, with slight pressure, first over a piece of glass or other highly-polished surface, and then over something that has a rougher surface, such as a

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planed board, a papered wall, or a velvety fabric, and you will experience much greater adhesion to the smoother objects, and may understand the important part which these moist pads play in the locomotion of the fly. They also act, in part, like the cushions of a cat's paw in protecting and preventing abrasion of the claws, which are very useful on the rougher surfaces, where the pads are less serviceable.

Now, compared with *Musca domestica*, the claws of *Sarcophaga sarraceniæ* are much the longest and strongest, and the pads much the largest, presenting three or four times the surface. These differences are, I think, sufficient to explain the fact that while the common fly walks with slippery and unsteady gait on the smooth pubescence (the retrorse nature of this pubescence sufficiently explaining the downward tendency of the movement), its sarcophagus congener manages to get a more secure footing; for not only does the latter present a larger adhesive surface, but the longer claws are more likely to reach beyond the pubescence and the bristles, and fasten to the cellular tissue of the leaf beyond. Moreover, Sarcophaga is more thickly beset with stiff, spinous bristles than Musca, and Dr. Mellichamp says that when disturbed it buzzes violently about, just as if an animated sheep-bur had fallen into the tube—not apt to go down, because it will hitch and stick, and finally, by main force, it generally emerges, but once in a while also succumbs.

In answer to the second question I can only say that there is nothing exceptional in the power of the larva to withstand the solvent quality of the fluid; it is, on the contrary, in accordance with the facts known of many species of Muscidæ and Œstridæ, some of which, like the well-known horse bot, revel in a bath of chyme, while others are at ease in the intestinal heat of other warm-blooded animals. It is also well known that they will often live for hours in strong liquids, such as alcohol and turpentine.

In answer to the third question, the moth is doubtless assisted in walking within the tube by the spines and spurs on the legs, which it, in common with most other moths, possesses—the tarsi in Xanthoptera being armed with spines, and the spurs being quite long, and in *semicroceæ* usually shod at tip with a corneous point. Its larva overcomes the treacherous surface by either carpeting it with silk or destroying it.

CONCLUSION.

To one accustomed to seek the why and wherefore of things, the inquiry very naturally arises as to whether Xanthoptera and Sarcophaga

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play any necessary or important role in the economy of Sarracenia. Speaking of the Sarcophaga larva, Mr. Ravenel asks, "May he not do some service to Sarracenia as Pronuba does to Yucca?" And if so, may not all this structure for the destruction of insects be primarily for his benefit? Can he be merely an intruder, sharing the store of provision which the plant, by ingenious contrivance, has secured for itself, or is he a welcome inmate and profitable tenant? Self-fertilization does not take place in Sarracenia, and the possibility that the bristly flesh-fly aids in the important act of pollination, lends interest to the facts. No one has witnessed with greater pleasure than myself the impulse which Darwin has of late years given to such inquiries; but we should be cautious lest the speculative spirit impair our judgments or ability to read the simple lesson of the facts. My own conclusions summed up are:

First: There is no reason to doubt, but every reason to believe, since the observations of Dr. Mellichamp, that Sarracenia is a truly insectivorous plant, and that by its secretions and structure it is eminently fitted to capture its prey.

Second: That those insects most easily digested (if I may use the term), and most useful to the plant, are principally ants and small flies, which are lured to their graves by the honeyed path, and that most of the larger insects, which are not attracted by sweets, get in by accident and fall victims to the peculiar mechanical structure of the leaf.

Third: That the only benefit to the plant is from the liquid manure resulting from the putrescent captured insects.

[Mr. Ravenel, in making a transverse section near the base of the young leaf, noticed large tubular cells passing down through the petiole into the root, and much of the liquid manure may possibly pass through these into the root stalk.]

Fourth: That Sarcophaga is a mere intruder, the larva sponging on and sharing the food obtained by the plant, and the fly attracted thither by the strong odor, as it is to all putrescent animal matter or to other plants, like *Stapelia variegata*, which give forth a similar odor. There is nothing to prove that it has anything to do with pollination, and the only insect that Dr. Mellichamp has observed about the flowers with any frequency, is a Cetonid beetle—the *Euryomia melancholica*, which, with other species of its genus, is commonly found on many different flowers.

Fifth: That Xanthoptera has no other connection with the plant than that of a destroyer, though its greatest injury is done after the leaf has

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performed its most important functions. Almost every plant has its peculiar insect enemy, and Sarracenia, with all its dangers to insect life generally, is no exception to the rule.

Sixth: That neither the moth nor the fly have any structure peculiar to them that enables them to brave the dangers of the plant, beyond what many other allied species possess.

PRELIMINARY CATALOGUE OF THE NOCTUIDÆ OF CALIFORNIA.

Part II.

BY AUG. R. GROTE,

Curator of Articulata, Buffalo Soc. of Natural Sciences.

10. Agrotis Cochranii Riley. (See ante p. 155).

The specimens are hardly to be distinguished from Eastern material; they are perhaps a little larger, and of a little different tone of color. My determination of this species as *lycarum* H.-S., based on a figure, is probably incorrect. It seems possible that Harris has described *A. Cochranii* under the name *messoria*, which should then be retained. More material of *A. fuscigerus* (ante No. 15) shows that this is a good but variable species, both in size and color. There is always a uniformity in the disposition of the ground tint over the primaries above, and usually the broad inner lunulations of the t. p. line and the median shade are characteristic. Some specimens have the hind wings of a pale yellowish testaceous, with double subterminal shade lines visible.

19. Dianthoecia niveiguttata (Grote). (Ante p. 156.)

In my ♀ specimen the ovipositor is apparently broken off.

28. Agrotis alternata Grote.

Mendocino, Mr. Behrens, June. Nos. 4 and 164. The California specimens vary in distinctness of the markings on the forewings as well as in the general color. One has the primaries entirely plain and unicolorus. I do not think there are grounds for suspecting a different species.

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29. Agrotis innotabilis Grote, Proc. Ac. N. Sci., Phil., 1874.

Sauzalito, Mr. Behrens, August.

30. Dianthoecia pensilis Grote, Proc. Ac. N. Sci., Phil., 1874.

Sauzalito, Mr. Behrens, Aug., Sept. 11th, Nov., both sexes. Nos. 181 and 183, 123, 147. The specimens are less brightly gray than those from Victoria. The male has the primaries more uniformly broken up with reddish. The white shade above internal angle is indicated by the pallor of an angulation of the subterminal line.

31. Hadena arctica (Boisd.), Bull. B. S. N. S., 1, p. 42.

Sierra Nevada, Hy. Edwards, Esq., No. 3513.

32. Hadena Bridghami (G. & R.) l. c. p. 142.

Sierra Nevada, Hy. Edwards, Esq., No. 3510.

33. Hadena devastator (Brace.)

California, Hy. Edwards, Esq. Mr. Behrens, No. 193.

34. Hadena lateritia (Hubn.) This is *H. dubitans* Walk., of my 'List.

Sierra Nevada, Hy. Edwards, Esq., No. 3512.

35. Hadena genialis Grote, List N. Am. Noct., p. 66.

California, Mr. Behrens, Nos. 7 and 64.

36. Hadena castanea Grote, Bull. B. S. N. S., 2, p. 156.

California, Mr. Behrens, No. 10 (red label).

37. Hadena albina Grote, l. c. p. 157.

California, Mr. Behrens; Sauzalito, May 15th, No. 78.

38. Hadena curvata Grote, l. c. p. 157.

California, Mr. Behrens, Nos. 70 and 99.

39. Hadena divesta Grote.

A moderate, slender bodied species, resembling somewhat in its colors *Dianthoecia pensilis*. Eyes naked; abdomen strongly tufted dorsally. Fore wings dark gray, with the basal field shaded with carneous ochrey; a patch above the submedian dash and extending between the spots, and the subterminal line shaded with the same color. There is a narrow black basal ray. Ordinary spots large and wide, concolorus, the blackish median shade marked on costal region between them. Median space wide, owing

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to the outward removal of the t. p. line; the latter somewhat as in *H. curvata*, but much more removed beyond the reniform. T. p. line angulated opposite the cell, geminate, even in its course, its inner line forming a regular series of slight lunulations; the filling in of the line becomes white inferiorly. Subterminal line preceded medially by cuneiform black marks. Hind wings fuscous, darker outwardly, with a transverse shade line without the middle. Beneath fuscous, with even common line and discal spots.

Expanse 32 m. m. Sauzalito, Aug. 12th, Mr. James Behrens, No. 145.

40. Hadena marina Grote, List N. Am. Noct., p. 67.

California, Mr. Behrens, No. 68.

41. Hadena flava Grote, Trans. Am. Ent. Soc., 5.

Victoria, Mr. Crotch; Colorado, Mr. Mead.

42. Morrisonia peracuta Morr., Bull. B. S. N. S., 2, p. 114.

California?

43. Eupsephopaectes procinctus Grote, Bull. B. S. N. S., 1, p. 138, pl. 4, fig. 6.

California, Hy. Edwards, Esq., No. 73; Mr. Behrens.

44. Hydroecia nictitans var. *erythrostigma* (Haw.)

California, Mr. Behrens, July 30th, No. 165.

45. Ochria sauzalitæ Grote.

Sauzalito, September 17th, Mr. Behrens, No. 161; Hy. Edwards, Esq. No. 135.

This species has a distinct clypeal tubercle, and is therefore congeneric with the European *flavago*. It belongs to *Gortyna* of Lederer, but not of Hubner, whose genus is equivalent to *Hydræcia* "B" of Lederer. For the European *flavago*, I have shown that *Ochria* Hubn. must be retained. I have separated *Hydræcia* "A." of Lederer under Guenée's name, but I am of opinion that for this genus, of which the type is *nictitans*, the term *Apamea* must be retained. It is not a little singular that the species which most nearly resembles *flavago* in America, viz., *cataphracta* Grote, should have no clypeal tubercle, and therefore must be referred to a different genus. In my "List" I have erroneously referred *Gortyna purpurifascia*, an Eastern species without the tubercle, to *Ochria*, which, so far should only contain *O. sauzalitæ*. The Cal. species differs,

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from *G, purpurifascia* by the t. p. line being slightly arcuate superiorly. In size and ornamentation the Californian species rather resembles *rutila*, which wants the tubercle.

46. Admetovis oxymorus Grote, Bul. B. S. N. S., 1, p. 133, pl. 4, fig. 5.
Sierra Nevada, Hy. Edwards, Esq., No. 2733.

47. Heliophila pallens [Linn].
California, Mr. Behrens, No. 10 [red label].

48. Heliophila phragmitidicola [Guenee].
Sauzalito, Sept. 25th, Mr. Behrens, No. 169.

49. Ufeus plicatus Grote, Proc. Bost. Soc. N. H., 16, p. 241.
California, No. 4414, Hy. Edwards, Esq.

50. Zosteropoda hirtipes Grote, List N. Am. Noct., p. 68.
California, Hy. Edwards, Esq., No. 3484.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 198.)

ASPIDISCA.

A. diospyriella. N. sp.

This species was bred from minute mines in the leaves of Persimmon trees *(Diospyros virginiana)*, gathered in great abundance at the "Bee Spring" camp of the Kentucky Geological Survey, in Edmondson County, a few miles west of the Mammoth Cave. I have never met with it in Northern Kentucky, where the Persimmon tree also grows, but is comparatively rare.

Head and thorax, and a little more than the basal half of the primaries pale leaden gray, with a metallic, almost silvery lustre; antennae fuscous above, silvery fuscous below; just behind the middle of the wing are two

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silvery streaks, one on the costal and one on the dorsal margin, the latter a very little before the former, and both strongly dark margined before and behind, their anterior dark margins meeting just behind the middle of the wing, where they are somewhat posteriorly angulated. The silvery streaks are not confluent, being separated by the anterior point of a dark brown dorsal patch, placed behind the dorsal streak. This dark brown dorsal patch is common to all species of the genus now known, and in all of them it forms the posterior margin of dorsal silvery streak, and becomes confluent with the posterior dark margin of the costal streak also; the anterior dark margins of both silvery streaks are margined faintly before with pale golden, much less distinct and covering much less space than in *splendoriferella;* behind the posterior dark margin of the costal streak is a small golden patch, as in *splendoriferella*, containing a small black dorsal streak (or, perhaps more correctly, margined by it.) In perfect fresh specimens of *splendoriferella* the extreme costa in this golden spot is always more or less streaked longitudinally with dark brown scales; these dark brown streaks are absent in this species, and besides, in *splendoriferella* the anterior dark margins of the costal and dorsal silvery streaks are not confluent and posteriorly angulated as in this species, but are separated by a narrow golden line, which is carried backwards between the silvery streaks themselves, thus connecting the golden patch before the streaks with the costal golden spot behind the streaks; in this species they are not so connected. Mr. Stainton, in a note on *splendoriferella*, in his edition of the Clemens papers, states that the silvery costal and dorsal streaks are confluent in that species. I have never found them so, but always under a good lens I find them separated by the narrow golden line as above stated. In *splendoriferella* the dark brown dorsal spot is separated from the fan-shaped apical spot by a narrow projection of the costal golden spot, which extends to a small spot of silvery scales on the dorsal edge of the apical spot; but in this species this golden projection is only represented by a small golden spot, which is separated from the costal golden one by a narrow blackish line, which extends from the brown dorsal spot to a small silvery spot at the beginning of the fan-shaped apical spot. As in all the other species, there is also a small silvery spot on the costal side of the fan-shaped apical brown patch, as well as one on the dorsal side, and the one at its beginning. The fan-shaped apical brown patch is traversed across its middle (between the two silvery spots) by a streak of paler brown, thus dividing it into two velvety black (rather than brown) spots. As in *splendoriferella*, there is a narrow brown

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line from the apex of the wing to the apex of the ciliae, and as in that species, the ciliae are yellowish rather than yellowish brown, as Dr. Clemens describes them. Dr. Clemens' statement that in *splendoriferella* there is a black apical spot, with metallic scales, in its centre, also seems to me misleading; there is only the fan-shaped apical black spot divided across its centre by a paler brown streak, at each end of which is a minute speck of silvery scales, and there is the third one at the beginning or handle of the fan-shaped spot—and this is true of all the species. I have not been able to detect separate from the brown dorsal patch what Dr. Clemens calls "a blackish brown hinder marginal line in the ciliae" in *splendoriferella*, unless by it is meant the brown band which crosses the fan-shaped spot; but by careful observation with a lens, two such lines may be found in the dorsal brown patch, darker than the surrounding portions, but which I have not been able to detect in *diospyriella*. The basal portion of the wing is more silvery than in *splendoriferella*, and the apical portion is much less golden, so that in this species the dark brown and silvery hues prevail over the golden, while Dr. Clemens was perhaps right in calling golden the ground color of the apical part of the wing in *splendoriferella*.

In *juglandiella* the apical part of the wing is more golden than in *diospyriella*, but less so than in *splendoriferella*. It has, like *diospyriella*, the anterior dark margins of the two silvery streaks confluent, and the silvery streaks are separated in *juglandiella* as just described in *diospyriella* But, as in *splendoriferella*, the golden costal patch sends off towards the dorsal ciliae and *to* the little silver spot which on that side margins the fan-shaped spot, a short streak which is not cut off from the rest of the golden patch by a process from the costal brown spot to the fan-shaped spot, as we have seen is the case with *diospyriella*. The case of *juglandiella*, like that of *diospyriella*, is nearly oval, whilst that of *splendoriferella* is rather trapezoidal. But *juglandiella* is but little smaller than *splendoriferella*, whilst *diospyriella* is but little larger than *salicifoliella* Some of the points of difference that I have mentioned are only brought out by the use of the compound microscope.

Considering the near relationship of the food plants (Walnut and Hickory), it is strange that I have not sooner thought that *juglandiella* may be *lucifluella* Clem. It may be, though I have not been able to recognize it in Dr. Clemens' description. Indeed, it seems to me that *lucifluella* and *A. ella* are nearer to each other, though I have not been able to recognize *A. ella* in Dr. Clemens' description of *lucifluella*. I

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am, however, satisfied that *A. ella* must either be *lucifluella* or the unknown species which mines *Ostrya* leaves. I have bred *ella* frequently from cases found adhering to various trees, but I have not been able to breed either the Hickory species (*lucifluella*) or the unknown *Ostrya* species. *A. ella* must be one of these, because the thoroughness of my search satisfies me that there are no other mines of this genus to be found in this region, except those of *splendoriferella* and *saliciella*, which are sufficiently distinct, and both of which I have bred. If *juglandiella* is *lucifluella*, then *ella* must be the *Ostrya* miner. *Splendoriferella* is decidedly the largest species that I have seen, but Dr. Clemens states that *lucifluella* is a little larger than it. This, however, is probably a mistake, as the cases that I have seen of *lucifluella* are even smaller than those of *splendoriferella*, and very greatly resemble those of *A. ella*, while also the vegetable hairs on the cases of *A. ella* appear to be identical with those on Hickory leaves.

The minute size of *diospyriella* is one of the strongest reasons for considering it a distinct species. *Al. ex.* $\frac{5}{32}$ inch.

MISCELLANEOUS.

DRYOCAMPA RUBICUNDA.—About four or five years ago I found a dead male specimen of this rare moth under an apple tree in our garden, and although a good deal rubbed, it was perfectly recognizable. This is, I am informed, the only instance of this moth having been taken in this city.—H. H. LYMAN, Montreal, P. Q.

DR. A. S. PACKARD, of Salem, Mass., is about to publish his long projected monograph of Geometrid moths, and designs giving a figure of each species. To make the work as complete as possible, specimens of this family are earnestly desired for study, and will be carefully returned, or other specimens sent in exchange.

DEATH OF FRANCIS WALKER.—We have just received the sad intelligence of the death of this distinguished Entomologist, who died at his residence, Elm Hall, Wanstead, on the 5th of October. A more extended notice of him will appear in our next.

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The Canadian Entomologist.

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THE LARVÆ OF DEPRESSARIA DUBITELLA AND GELECHIA RUBENSELLA.

BY MARY E. MURTFELDT, KIRKWOOD, MO.

Being much interested in the Tineidæ, Mr. Chambers' articles on this family of moths are the first to receive attention as the successive numbers of your magazine come to hand.

I have had the satisfaction of rearing from their larvæ many of the winged gems described in your pages, among others the two species named above. Now, as Mr. C. seems to have been in some doubt as to his own determination of these species, of which he has as yet—as he informs me—seen only the imagines, it occurs to me that a description of their larval characteristics might afford some aid in deciding the doubtful points.

The larva of *Depressaria (Gelechia) dubitella* Cham. is very characteristic and beautiful. It may be found during the months of July and August on *Ambrosia artemisiæfolia*, concealed in a fusiform case, which it constructs by drawing together the pinnatifid divisions of the leaf. I think it forms but a single case, which at first consists of but two divisions of the leaf drawn together with silken threads. As it increases in size, its domicile is enlarged by the incorporation of other lobes of the leaf. It is always to be found in its case in the daytime, and probably emerges only at night to feed.

This larva is rather more than half an inch in length, elongate and slightly flattened. Head horizontal, semi-elliptical, highly polished jet black. First segment horny, black and polished like the head. Second segment, anterior half *velvety* black, posterior half ivory white, ornamented above with five linear black marks, extending longitudinally backward; the dorsal and sub-dorsal ones do not reach to the posterior edge of the segment, while the lateral lines, above the stigmata, do. The remaining segments are of a translucent white color, varying from pearly to yellowish. They are marked with three faint, longitudinal, brown lines and with a few

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minute, black, piliferous spots, each of which gives rise to a single, short, fine hair. Venter of the thoracic segments and thoracic legs black; prolegs and under surface of abdominal segments whitish. The change to pupa usually takes place within the larval case. Chrysalis slender, smooth, bright reddish brown, except the head and wing sheaths, which are much darker. Mr. Riley once brought me a leaf-folding larva on Hackberry, which resembled these Ambrosia case-makers in every respect, but as I did not succeed in obtaining the imago from it, I am unable to say whether or not the insects were identical.

In *my* specimens of *dubitella* the purple-brown of the anterior wings is marked with *four* ochreous spots, instead of *three*, as in Mr. Chambers' description, and the hind wings are more nearly gray than fuscous.

There is another leaf-folding larva of the same size and habit of *D. dubitella*, which also feeds on *Ambrosia artemisiæfolia*, and which is even more elegantly marked in black and white than the latter. This insect, which I take to be a true but undescribed Gelechia, I may, perhaps, describe in a future paper. I would respectfully propose for it the name of *Chambersella*.

The larva of *G. rubensella* is an external feeder on Oak. It inhabits a thin web at the base or near the tip of the leaf, and skeletonizes the upper surface of the latter. Its length is rather more than 3/8 of an inch. In form it is elongate and sub-cylindrical, tapering anteriorly and posteriorly from the middle, and has the sutures deep. The color is grass green, striped with numerous very fine longitudinal lines of purple, and ornamented with two sub-dorsal rows of conspicuous purple spots, situated at the sutures. Head horizontal, pale brown, pointed toward the jaws with two irregular whitish dashes on each side. Legs and prolegs pale green—the latter very narrow. This pretty larva is as characteristic in its habits as in its appearance. It does not touch the leaf except when feeding, but remains suspended in a sort of gallery of delicate web-work, through which it moves with surprising rapidity. It changes to pupa within a frail cocoon, on the surface of the ground. The chrysalis is pale brown, slender and chiefly characterized by long, free wing sheaths. The moth issues in about ten days. In its perfect state this insect bears so close a resemblance to *G. roseosuffusella* Clem., that it is difficult to distinguish it from the latter. It is, however, as a rule, smaller, darker and more roseate, while the larva is entirely different, that of *G. roseosuffusella* mining the leaves of Clover, and being much less strikingly marked.

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ON ENTOMOLOGICAL NOMENCLATURE.

BY JOHN L. LECONTE, M. D., PHILADELPHIA.

Part II.—On Generic Types.

"Ignorato genere proprio, nulla descriptio, quamvis accurate tradita certum demonstret; sed plerumque fallat."—CÆSALP. apud Linn., Syst-Nat., xii, 1, 13.

In the first part of this essay I endeavored to show the confusion which resulted from the application of the law of priority to the names employed in the early development of our science by persons who had no idea corresponding to the law which has since been formulated. We will now attempt to discuss the second great fallacy in the exegesis of the writings of the founders of the science; the selection on principles, more or less arbitrary, but always opinionative, of generic types, when these *have not been explicitly* mentioned by the author.

With the more minute observation of differences in structure, and the consequent multiplication of genera, has arisen an idea that all classification, generic and otherwise, is simply a human contrivance for the purpose of expressing degrees of resemblance between the organic forms which we collect and recognize as distinct.

In short, that our best efforts to ascertain the relations of organic beings has resulted, not in a system, but in a dictionary.

This was not the idea of the fathers in science—nor is it the idea of many respectable students of the present day.

The language of Linnæus is clear upon this subject. 'Genus et species naturæ opus;' to him and to his followers there was no generic type. Each species comprised in the genus was equally typical, unless, as in rare cases, it was mentioned as aberrant, with a suspicion expressed in some instances that it would be subsequently separated as a distinct genus. When dissections were made, as in the fuller definitions in the foot notes in the works of Fabricius, it was not because the dissected species were selected peculiarly as the type of the genus (for in many instances the dissections are not part of the generic formula); but merely that the most common and available species was chosen for the purpose of giving more information than was conveyed by the condensed generic diagnosis.

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In the gradual progress of science, and with the multiplication of genera, it came to be considered that the person who recognized the necessity of subdividing an ancient genus, should exercise his judgment regarding the part to which the old name should adhere; and in most instances this was attended with no inconvenience.

Rarely, as in the case of TEMNOCHILA *Ww.*, the name of the original genus TROGOSSITA was retained for a group which did not accord with the original definition; the new name was imposed upon the set of species which should have kept the original name. These instances are but few in number, and the exposure of the error committed is sufficient to cause its immediate correction.

I would therefore infer that the practice of some students in recent times, of applying the older generic names in a different sense from that in which they were restricted by the persons first making the divisions, is founded upon an incorrect interpretation of what was formerly meant by a genus; and that these old authors, were they now alive, would strongly resist the limitation of their generic idea to a single type-species.

When the describer of a genus establishes the genus upon a single species, either because it is the only one known to him, or because, as is sometimes the case, he does not choose to enumerate the others, then of course, from the accident of the case, that particular species becomes typical of the genus, and must remain so as long as the present system of nomenclature is adopted. But when, on the other hand, several species are included in the genus, and they all agree accurately in the possession of the *characters mentioned* as defining the genus, they must in my opinion be regarded as *equally typical.* It would save much confusion in interpreting the modern use made of these restricted older names, if in all instances in systematic works the restricting authority was added in parenthesis.

A more difficult source of confusion is that resulting from the erroneous position ascribed to a genus, which renders it, with the ordinary usages of interpretation, absolutely irrecognizable; as when, for instance, the Byrrhide genus AMPHYCYRTA was described by Mannerheim as a Tenebrionide, under the name Eucyphus, and the genus AMPHIZOA also as a Tenebrionide (Dysmathes). In these two cases Mannerheim's names fail from want of priority, but had this not been the case, I still maintain that the names of erroneous position should be suppressed in favor of later names which may have been independently given, and correctly

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defined. The genus being erroneously described, of course fails to represent any idea realized in nature, and the specific name must therefore fall with it, and the whole name be quoted in synonymy, with the error mark (‡) appended.

While I fully recognize the importance of having the same object always spoken of by the same name, I must frankly say that the forced uniformity aimed at by somewhat arbitrary processes, in a few familiar instances, seems to be capable of producing still greater confusion. To take an example: our common tumble-bug is equally known to most students of entomology as CANTHON or COPROBIUS, and specifically as *lævis* or *volvens*, the first generic and specific names having priority. Recently, however, on the authority of Gemminger and Harold, and of Mr. Crotch, the specific name *hudsonias* has been resurrected from Forster's Centuria Insectorum. The priority of this last name is not borne out by any evidence in the books containing the descriptions, and if it be valid, can only be demonstrated by careful bibliographical investigation of a collateral kind. It is unreasonable to expect that our familiar names for common objects, for it is only among them that such changes are likely to be suggested, should thus be altered where there can be any excuse for resisting the innovation. But I will go farther and say, that where two names have become from peculiar circumstances equally known, there can be no serious objection to the writer using that one for which he has preference. If I had occasion to write concerning the great Aristotle, it is certain that all those persons capable of understanding what I would desire to say about him, whether I mentioned him by his name or spoke of him as the Stagyrite, or even as the Preceptor of Alexander, would know who was meant.

When the different names which have been applied to the most common species, have been recognized by competent authorities as synonyms, and have been thus collated in accessible registers, catalogues or systematic works, it is not a subject worth contention which of these equally known names may be used by individual writers. Certainly it is wrong for a person, without a careful study of bibliography, to change his habit in the use of a name, because the latest authority advocates a subversion. It is by no means true in natural history that the latest is the best, and those who are not critical students in these subjects will do well to follow the advice given in the first part of this essay, to *resist innovation*,* until they find

* Confusis enim nominibus omnia confundi necesse est.—CÆSALP. apud Linn., Syst. Nat. xii, i, 13..

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that the later views are adopted by those to whom they have a right to look for instruction upon these technical points. Let them, at any rate, be clear in their minds that the changes are in accordance with the existing laws, or let them agitate for such alteration in the current code as will produce legally the modifications they desire.

Other special cases may arise of still greater difficulty than those I have here discussed. For the proper solution of these, I think the suggestion of Mr. Alfred Wallace* is most valuable. It is that all disputed points in nomenclature should be referred for investigation and decision to a committee of experts. Such a committee could be readily formed in the Entomological Club of the American Association for the Advancement of Science, which would dispassionately determine all questions relating to the progress of the science in North America, and announce their decisions each year. These decisions would, I am convinced, be cheerfully adopted by most, if not all of those who are occupied in the study of the insects of this continent.

One more suggestion in conclusion. It is this: That in proportion as the objects become well known, and especially in those species which fortunately possess no synonymy, all reference to authorities should be dropped, except when *bibliographical reference* to a full description or figure is necessary. If, however, a synonym must be mentioned, let the author of this supplementary name be quoted.

Should this suggestion be adopted, it will result that the name of the describer will not be unnecessarily connected with the valid name of the species, and one strong support of the small personal vanity which I have criticized in the first part of this essay will be destroyed. Another important result will be that the maker of a synonym will know that his name will be inseparably connected with that synonym, whenever it is mentioned; and that, therefore, so far from being an honor, or a recognition of good work, the use of an authority will come to be known as an indication of bad or imperfect work, and the makers of species on hasty study or on defective materials will be discountenanced.

* Address of the President, Trans. Ent. Soc. London, 1871, lxviii.

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ON SOME OF OUR COMMON INSECTS.

No. 15. THE IO MOTH—Saturnia (Hyperchiria) Io, Fabr.

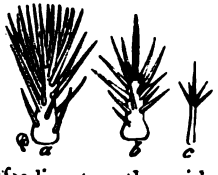
BY E. B. REED, LONDON, ONT.

This lovely moth is well worthy a place in the cabinet of the collector, and is always sure to attract notice and admiration. The larva, of which fig. 27 represents a full-grown specimen, is of a most delicate apple or pea green colour, with a broad, dusky white stripe at each side, bordered with lilac on the lower edge. The body is covered with clusters of green bristles, tipped with black. These bristles are exceedingly sharp, and when the insect is handled, will produce a very irritating sting, similar to, but much sharper than that of the nettle, and the effect of which causes a reddening of the flesh and the immediate appearance of raised white blotches, which last for a considerable time.

Fig. 27.

Fig. 28 shows the appearance of these bristles, some of them, as *b*, being stouter and more acute than the others, and able to inflict a sharper and more penetrating sting. According to Mr. Riley, the irritating property belongs to the substance of which the spines are formed, and his opinion was strengthened by the fact that the spines of a cast off skin, which had been in his cabinet for years, still retained the irritating power.

Fig. 28.



In the earlier stages the caterpillars are gregarious, feeding together side by side, and in going to and returning from their place of shelter, moving in regular files, like the processionary caterpillars of Europe (*Lasiocampa processionea*). When about half grown they

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disperse, each seeking a location for itself. They moult five times, devouring their cast off spinous skins. After being in the larval state about eight weeks, they arrive at maturity, and are then about two inches and a half long.

Their food plants are numerous. They have been found on Black Locust, Indian Corn, Willows, Sassafras, Wild Cherry, Elm, Hop-vine, Balsam, Balm of Gilead, Dogwood, Choke Cherry, Currant, Cotton and Clover. I, myself, this year found it on the English Filbert, and raised it to maturity on that plant. I have, however, more commonly found it on the Choke Cherry. The larva, when full grown, crawls to the ground, where, amid the loose leaves and rubbish, it forms a rough covering, within which it makes a slight cocoon of tough, gummy, brown silk. In this retreat a change is soon effected to the pupal or chrysalis state, and having remained therein during the winter and spring months, the moth emerges in the perfect winged state about June. The moths are especially remarkable for the difference between the sexes, both in size and colour.

The male, fig. 29, which is much the smallest, is of a deep Indian or maize yellow; on the fore wings are two oblique, wavy lines, near the hind margin, and a zigzag line near the base. There is also a large, dark, reddish, central reniform spot or blotch. The hind wings are broadly shaded with purple, next to the body; on the hinder margin is a purplish curved band, and within this again is a smaller one of a dark purple or violet colour. In the centre of this last band and the middle of the wing is a large, round, blue spot, with a whitish centre and a broad border almost black; the under side of the wings is of the same deep yellow; the fore wings showing the same dark occellated spot, as on the other side, and having the inner margin broadly shaded with purple. The hinder wings are more uniform in color, with a transverse purple line and a very small, distinct white spot representing the centre of the large spot on the upper side.

Fig. 29.

The body is also deep yellow.

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The female, fig. 30, is considerably larger; the specimens vary very much in color, from a dark purplish brown to a warm ochreous red. The fore wings have similar wavy, zigzag lines; the reniform blotch being less distinct than in the male; the inner margin is of a deeper colour, and is

Fig. 30.

thickly coated with short hair, like the head and thorax. The hind wings are similar to those of the male; the under side has the same uniform colour, and the markings and spots as in the male.

The body is the same shade as the wings, the abdomen being a little lighter in colour, and each segment being bordered with a narrow reddish band.

The moths vary in size from two and a half inches in the male to three and a half in the female.

The eggs are deposited on the under side of the leaf, and are described by Mr. Riley as being compressed on both sides and flattened at the apex, the attached end smallest, in colour cream white, with a small black spot on the apical end and a larger orange one on the sides.

TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

A collection of Tineina received from Mr. Belfrage, of Waco, Texas, presents some points worthy of mention apart from the descriptions of the new species.

The collection consists of about two hundred and fifty specimens in tolerably good condition, referable to seventy-six species and twenty-seven genera. Such a number of genera and species is evidently typical of the

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Tineina of the locality where they were collected. Twenty-nine of these species belong to the genus *Gelechia*, and twenty-five others belong in the same family. Fifty-three of these species thus belong to the *Gelechidæ*, and only twenty three to other genera. The *Gelechidæ* are numerous everywhere, and a preponderance of species belonging to this family is to be expected in almost any collection, but I have not known any other collection in which it was so great as in this one.

The collection contains seven species of *Laverna*, and another species which I have made the type of a new genus very nearly allied to *Laverna*. These seven species differ from each other somewhat as to the neuration, and also as to the raised tufts on the wings, but perhaps not to any greater degree than do well recognized species of *Laverna*, as e. g. *L. Staintoni* and *L. langiella* of Europe. Mr. Stainton *(Nat. Hist. Tin., vii)* enumerates only twenty species belonging to this genus, and three others are also known from this country. This collection then contains nearly one-third as many species of this genus as were heretofore known altogether. Of the species heretofore known, but one (if I rightly understand Mr. Stainton) is fairly described as white, that being the prevailing or ground color, though some others have more or less white markings. But of these seven, five may fairly be placed in the white section; and the other two are also strongly marked with white.

The collection contains five species which I have placed in *Butalis*, though with great doubt as to two of them, which are totally unlike all other species of the genus in color, though I have not been able to discover any structural differences whatever.

But it is, perhaps, more remarkable for what it does not than for what it does contain. As before stated, such a collection is typical of the Tineina of the locality where it was collected. Yet it contains no specimen of *Lithocolletis*, which, both in the collections of Dr. Clemens and myself, is the genus next most numerous in species and individuals after *Gelechia*. *Tinea*, *Coleophora*, *Gracilaria*, *Bucculatrix*, *Tischeria* and *Nepticula* are also genera usually numerous in species and individuals. Yet this collection contains only one *Tinea*, two *Coleophora*, no *Gracilaria* (unless a single species of *Corisceum* be held to represent it), and three? species of *Bucculatrix*, one of which is a somewhat aberrant form.

All of the species are new except ten. These are as follows:

Gelechia cercerisella Cham.,
" *æquæpulvella* "
Ypsolophus cupatoriella Cham.,
Plutella cruciferarum Zell.,

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Gelechia disco-ocelella Cham.
" *roseo-suffusella* Clem.,
Hagno faginella Cham.,
Holocera glandulella Riley,
Bucculatrix pomifoliella Clem.,
Hamadryas Basettella "

Of these ten species, *G. roseo-suffusella*, judging from the number of specimens in the collection, appears to be by far the more numerous, though it may turn out that some of the specimens do not belong to this species, but to a very closely allied and undescribed one; and all the specimens are of a darker hue than those from the Northern States. This species appears to be distributed nearly all over the United States, and is perhaps the most common species of the genus.

G. cercerisella was originally placed by me in *Depressaria*, and I was led to do this by giving too much importance to the neuration of the wings. It is, however, properly referable to *Gelechia*. The specimens—thirteen in number—belong to a very well marked variety. In all the specimens (a great many) that I have heretofore examined, the fore wings are marked just within the middle of the dorsal margin by some faint, short, ochreous streaks, only discernible distinctly under a lens. In these thirteen specimens these ochreous streaks are not present, and their place is occupied by a larger snow white spot, like those on the margins of the wings.

G. æquæpulvella is well represented in the collection, but there appears to be some variation in the shade of the ground color and in the density of the dusting.

The single specimen of *Holocera glandulella* differs from Mr. Riley's description as follows: there is a single discal spot behind the angulated line, and two others at the end of the cell, instead of "two discal spots," as stated by Mr. Riley; besides, "three tolerably distinct, dusky marks around the discal spots" are wanting. Unfortunately I have now no typical specimens of this species, with which to compare it, but I doubt not it is the same.

Hamadryas Bassettella was described by Dr. Clemens from specimens sent to him from Connecticut. He states that it appears to be congeneric with a portion of *Gelechia*. The remark is applicable to almost every species of the family *Gelechidæ*. Dr. C. does not seem to have observed its very close relationship to *Dasycera*, nor, perhaps, its still closer relationship to, or even identity with the genus *Pancalia*. The antennae in *Bassettella* are stout, and the ciliation is microscopic, quite distinct in this respect from species of *Dasycera*. The wings of *Bassettella* are narrower

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and the form of the secondaries is different, approaching that of *Butalis*. Mr. Stainton's figure (Ins. Brit., v. 3) represents the secondaries of *D. sulphurella* narrower and more pointed than are those of *D. Newmanella*, but less so than those of *Bassettella*. The ornamentation of *D. Newmanella* resembles that of most species of *Butalis*. The ornamentation of *Bassettella* rather resembles that of *Pancalia*, to which, also, I think, it makes the nearest approach structurally.

Hagno faginella seems to have the transverse dusky lines of the primaries darker and more distinct than in the Kentucky specimens, and those about the middle of the wing condensed into two indistinct fascia.

Plutella cruciferarum presents nothing unusual; but there is in the collection a single specimen which I incline to consider an undescribed species. In it the lighter color of the inner margin projects into the darker part of the wing only once, and that very faintly, behind the middle of the wing; otherwise the line between the two colors is nearly straight; the markings in the posterior portion of the costal half of the wings also differ somewhat from those of *P. cruciferarum*. But the specimen is imperfect, and I shall not at present separate it from *cruciferarum*. From an examination of my collection of *cruciferarum*, I concur with Mr. Stainton's suggestion that *P. mollipedella* Clem. is the female of *P. cruciferarum*.

The new species are as follows:

AMADRIA? Clem.

A. Clemenstella. N. sp.

Yellow; the palpi are a little paler, except the outer surface of the second joint. Primaries with minute brown spots arranged in transverse rows; these require close observation: one spot on the fold and one on the end of the disc, a little larger than the others. *Al. ex.* ½ inch. There is also a row of small fuscous spots around the base of the ciliae.

TINEA.

T. obscurostrigella. N. sp.

Dark fuscous; the primaries obscurely mottled with sordid yellowish; there is a row of indistinct yellowish spots or streaks on the costa, from the middle to the tip, and along the base of the dorsal ciliae. *Al. ex.* ⅝ inch. Season, October.

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ANESYCHIA.

A. multipunctella. N. sp.

Second joint of the palpi dark brown, tipped beneath with scattered white scales, and with a few scattered white scales above; third joint white, tipped beneath at the base with dark brown; face black; vertex white, with a central black spot; antennae fuscous; thorax white, with six black spots, one of which is placed close to the base of the wings and is continuous with the dark brown of the wings; two others on top, and one on each side a little before the tip. Primaries shining dark brown or black, with a wide white streak extending along the dorsal margin from the base nearly to the tip, and a white costal spot close to the tip; there is a sinus, or projection of the white into the dark brown portion, just before the middle, and from thence to the tip the line between the two colors is irregular, with another sinus behind the middle; there is a small black spot in the white at the first sinus, and six others along the dorso-apical margin at the base of the ciliae, and another in the costal white spot, or more properly, perhaps, there are three in the costal white spot, two of them being confluent with the dark brown color around it; ciliae white, except at the tip. *Al. ex.* ½ inch. Season, April and May. In nine specimens I detect no variation.

A. miruscila. N. sp.

Palpi pale yellowish ochreous; the second joint has two brown spots on its outer surface, that nearest to the base being largest; the third joint has the base and tip dark brown. Head pale yellowish or nearly white; antennae pale fuscous; thorax pale yellowish ochreous, with four brown spots, two of which are about the middle and one on each side near the tip. Primaries white, faintly tinged with ochreous yellow, and with a rather wide golden brown basal streak, which begins near the costa and diverges thence to the end of the cell, and from thence narrows and becomes more diffuse towards the apex, which it does not quite attain. The costal whitish portion is more streaked and suffused with ochreous than the dorsal portion, which has a small brown spot before the middle; there is likewise a row of small brown spots around the apex, at the base of the ciliae. *Al. ex.* ½ inch. Season, April and May.

I have not examined the neuration, and the ornamentation is unusual in the genus; but the other characters are those of *Anesychia.*

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HARPALYCE, *gen. nov.*

In the neuration, and more decidedly in the form of the secondaries, this genus makes a very near approach to the *Tortricidæ*. The hind wings are as wide as in any genus of that family. The primaries, however, rather resemble those of the genus *Hagno*, and the palpi also ally it to the *Gelechidæ*.

Wings nearly horizontal (in the dead insect).

In the primaries the costa is regularly arched, and the wing is widest about the middle; the costa attains the margin behind the middle; the cell is rather narrow; the subcostal gives off four branches to the margin before the end of the cell, the first and longest of which arises before the middle, and the last of which arises close to the end of the cell, and reaches the costal margin close to the apex; the apical branch reaches the apex or the margin close to and beneath it; the discal vein gives off two branches; the median gives off, close to the end of the cell, a single branch, which becomes furcate, and the apical branch runs to the margin, parallel to the discal branches; the fold is thickened at the end, and the submedian vein is long and furcate at the base.

The secondaries are at least one-half wider than the primaries, their width being equal to about two-thirds of the length; the costa is strongly arched near the base, and *very* faintly sinuate before the apex, which is rounded, and the dorsal margin *very* faintly sinuate beneath it; the costal vein is sinuate from the margin and almost coincident with the subcostal towards the base, and attains the margin near the apex; the cell is wide; the subcostal is furcate behind the cell, with the superior branch delivered to the apex; the discal vein is curved or angulated, the angle pointing towards the base, and *near* the median it is again angulated, the angle pointing backwards, and a branch proceeds from it to the margin; the median sends a branch from behind the middle to the margin, and from the origin of the branch bends up to its union with the discal, at which it becomes furcate. Submedian and internal veins distinct. In one of the species (*canusella*) the costa is not so much arched, and the posterior margin not at all sinuate beneath the apex, and the discal vein is curved (not angulated) and unites with the median without forming a second angle, what I have described as the discal branch vein, being continuous with the median and arising from a common origin with the furcate branch.

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Tongue rather short; maxillary palpi minute; labial palpi simple, *slender*, slightly overarching the vertex, the third joint about half as long as the second, and pointed; antennae simple, more than half as long as the primaries, with the basal joint short and a little enlarged; scales of the posterior portion of the vertex a little roughened, but not forming a tuft; eyes globose, of moderate size; ocelli, none.

H. tortricella. N. sp.

Yellowish or straw color; head and hind wings paler, nearly white; there is a minute, pale brownish spot at the end of the disc. *Al. ex.* ¾ inch. Season, May.

H. albella. N. sp.

White; a minute, indistinct, ochreous spot at the end of the disc, on the forewings, and a very few widely scattered dark brown scales. There is a brownish, ochreous streak on the outer surface of the second joint of the palpi. *Al, ex.* ½ inch. Season, June, July and August.

H. canusella. N. sp.

Pale grayish, almost white, with obscure patches of very pale fuscous on the primaries; a small brown spot within the dorsal margin, before the middle; another a little behind it on the fold, and another at the end of the disc. At the beginning of the ciliae is an obscure, narrow, curved, pale fascia, which is very concave towards the base of the wing. *Al. ex.* ⅝ inch.

GELECHIA.

G. thoracealbella. N. sp.

Second joint of the palpi brush-like, the brush spreading and faintly divided; third joint slender, more than half as long as the second.

Palpi whitish, the second joint ochreous brown at the base, and the scales of the brush tipped with ochreous yellow; face, head, and a wide streak from the head to the apex of the thorax, white. Antennae, sides of thorax over the wings, and the primaries brown, the primaries very faintly streaked with whitish towards the apex. *Al. ex.* ⅝ inch.

G. minimaculella. N. sp.

Second joint of palpi brush-like; third more than half as long as the second.

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Head and palpi ochreous yellow; palpi with the base of the second joint, a spot on its outer surface, near the tip, and a ring around the third joint, near the tip, dark brown; antennae dark brown; thorax brownish ochreous above, except the sides just above the wings, which are dark brown like the primaries, and, like them, faintly tinged in some lights with a bluish cast. Near the base of the primaries, extending from the costa to the fold, is a narrow, irregular, interrupted, somewhat oblique ochreous yellow line or series of small spots; there are three or four minute ochreous yellow spots on the disc, and a spot of the same hue about the beginning of the dorsal ciliae, and an opposite costal one. *Al. ex.* ¾ inch.

G. ochreosuffusella. N. sp.

Second joint of the palpi brush-like; third joint about half as long as the second.

Insect dark brown; second joint of the palpi above sprinkled with white or pale yellow scales; third joint ochreous or yellowish, except at the base and a narrow annulus before the middle, which are dark brown; head ochreous, densely dusted with dark brown, so as almost to obscure the ground color; thorax, base of the wings, and a streak along the fold suffused with reddish ochreous; primaries sparsely dusted with whitish and with a reddish ochreous streak at the base near the costa, as well as that on the fold, and with the costal and dorsal spots faintly indicated. The white dusting of the primaries is sometimes very distinct, and it forms an interrupted fascia or rather a line of small specks across the wing, just before the ciliae. *Al. ex.* ¾ inch.

G. depresso-strigella. N. sp.

Second joint of the palpi brush-like; third joint about half as long as the second.

Brown, with a grayish ochreous tinge, the wings streaked with ochreous and the palpi sprinkled with whitish scales. Thorax, basal portion of the wings, and a streak along the fold suffused with reddish ochreous; four very indistinct, oblique, dark brown lines extend along the disc, and the spaces between the veins in the apical part of the wing are each marked with a similar line, and all of these lines appear to be depressed or sunken below the general surface of the wing. *Al. ex.* ¾ inch. Season, July, August and September. It resembles the preceding species, but the

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brush is smaller, color of the head and palpi different, and the narrow longitudinal depressed brown lines separate it from that species.

G. pallidagriseella. N. sp.

Second joint of the palpi brush-like; third joint about half as long as the second.

Palpi and head whitish, almost hoary. Pale yellowish gray, a little suffused with ochreous on the thorax and primaries. There is a minute rust red spot about the middle of the disc; extreme costa dark brown at the base; antennae dark brown. *Al. ex.* ¾ inch.

G. quadrimaculella. N. sp.

Third joint of palpi longer than the second; palpi not at all brush-like.

Dark brown, in some lights tinged with ash gray; a small dark brown spot on the fold within the basal fourth of the primaries; another also on the fold about the middle; another near it, about the middle of the disc, and another at the end of it. *Al. ex.* ⅝ inch. Season, May. The brown spots are very indistinct, differing but little from the general hue.

G. Wacoella. N. sp.

Second joint of palpi with a small brush; third about as long as the second.

Ochreous, sprinkled above with dark brown; third joint dark brown; head and thorax dark brown, with a faint ochreous tinge. Primaries dark brown; two ochreous spots on the costal margin near the base, another at the beginning of the ciliae, and two small spots of the same hue on the fold before the middle. *Al. ex.* ⅝ inch.

G. crescentifasciella. N. sp.

Palpi not brush-like; third joint about as long as second.

Ash gray, microscopically dusted with brown; there is a crescentic, very indistinct pale fascia at the beginning of the ciliae, very concave towards the base of the wing; one or two minute dark spots on the disc, and one at its apex. *Al. ex.* ½ inch. Season, April and May. It resembles *G. quadrimaculella*, but is smaller and of a more ashen hue. Sometimes the fascia is absent.

G. pullusella. N. sp.

Palpi slender, simple: third joint more than half as long as the second.

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Brown, microscopically sprinkled obscurely with whitish scales. *Al. ex.* 1/3 inch. Season, August.

G. plutella. N. sp.

Palpi simple, slender; third joint more than half as long as the second, and pointed.

Face and palpi white; vertex pale yellowish, with a dusky central spot; antennae pale yellowish; patagia and costal half of the primaries, almost to the tip, creamy white; thorax and dorsal half of primaries and the tip dark brown; the whitish portion of the primaries is widest at the base, and the dark brown portion at the apex, and the whitish part sends two short, oblique projections into the brown one just before the middle and the other just behind it. *Al. ex.* ½ inch. Season, August.

The ornamentation of the wings bears considerable resemblance to that of *Plutella cruciferarum*, except that the colors are reversed.

G. sella. N. sp.

Second joint of the palpi thickened beneath towards the tip, but not at all brush-like; third joint more than half as long as the second.

Head yellowish white, sometimes with a wide longitudinal brownish streak on the vertex. Palpi very pale yellowish, with the second joint externally brown and internally streaked or sprinkled with brown, and the third joint, with the tip and a band around the middle, dark brown. Thorax and primaries pale ochreous gray; under the microscope pale ochreous yellow, somewhat dusted with fuscous. There is a velvety dark brown spot on the fold, not far from the base, behind which is usually a dark brown dorsal streak, extending more than half across the wing, perpendicular to the margin, placed before the middle, but sometimes it is represented only by a triangular spot on the fold, and which does not touch the margin; and there is another small spot of the same hue at the end of the cell, and surrounded by a paler annulus; base of the costal margin and six or seven small spots along the costa dark brown, the last of which is just before the ciliae; and there is a narrow ochreous basal streak just within the costal margin; occasionally the spots along the costa are absent. *Al. ex.* ½ inch. Season, July and September. It is a handsome species.

G. trimaculella. N. sp.

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Second joint of the palpi scarcely thickened beneath; third half as long as the second; acuminate.

Head, antennae and palpi pale yellowish white; third joint of the palpi tinged with fuscous. Thorax and primaries very pale ochreous yellow (under the lens sparsely and minutely dusted with pale reddish ochreous scales); two small, nearly circular, blackish spots before the middle, one beneath the fold, the second on the disc, a little behind the first one; and a larger one of the same hue at the end of the disc, and a row of minute, dark brown spots around the base of the ciliae. *Al. ex.* ½ inch. Season, April and May.

G. elegantella. N. sp.

Second joint of palpi scarcely thickened beneath; third more than half as long as second.

Palpi white; second joint yellowish towards the tip, the third with three brown annulations, one at the base, one before the middle, and one before the tip, sometimes connected by a line along the under surface; head and thorax sordid white or yellowish, slightly iridescent; base of the primaries white, iridescent, narrow, but wider on the dorsal than on the costal margin; this is followed by an oblique, ochreous or yellowish orange band, which crosses the wing and is margined with brown before and behind, and followed by an oblique white band, which also crosses the wing, and is rather widely margined behind by an iridescent, brown line, terminating at a *smooth* tuft of raised scales on the dorsal margin, the tuft or rather smooth elevation being metallic and highly iridescent, as also are the brown margins of the ochreous bands; the dark brown, posterior margin of the second brown fascia is produced backwards along the disc and passes backwards along the disc, inclining towards, but not reaching the base of the dorsal ciliae, and containing three smooth, metallic elevations, like the one on the dorsal margin, the wing between it and the costa being white, and between it and the dorsal margin the wing is white and pale ochreous. The oblique streak terminates just before the dorsal c[illegible]ae at a curved fascia, which is very convex towards the base, is reddish c[illegible]reous on the dorsal margin, and brown on the costal margin. This c[illegible]ved fascia is followed by an oblique one, which is nearest to the tip on t[illegible] costal margin, and the costal portion of it is wide and white, and the d[illegible]rsal portion brown, and in some lights is brilliant metallic; the brown p[illegible]rtion is narrow where it meets the white costal portion, and passes

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around behind it to the costal margin, and thence curves as a narrow line backwards around the apex at the base of the ciliae, returning to its origin on the dorsal margin, thus enclosing an oblong, egg-yellow or golden patch, parallel with the base of the dorsal ciliae. In some lights this fascia is dull brown, not at all metallic, and the yellowish ochreous parts of the wing become almost brick red; and, in truth, all the colors of the wing, except the dark velvety brown streak which passes obliquely the disc, are so variable that it is very difficult to give an adequate or intelligible description of the insect. The ciliae are fuscous. *Al. ex.* ⅜ inch. Season, May, August and September. I have also received it from Miss Murtfeldt, from St. Louis.

This species belongs to the same group with *G. roseo-suffusella*, &c., and is the prettiest *Gelechia* that I have seen.

G. rufuscila. N. sp.

Second joint of the palpi somewhat thickened beneath before the apex (nearly as in the European G. populella); third joint a little longer than the second.

Palpi white; second joint externally dark brown at the base. Head, thorax and base of the primaries yellowish white, with a faint reddish tinge, which gradually deepens and becomes more distinct as it passes backwards over the wings, and about the basal one-fourth becomes bright brick red, and continuing to deepen, becomes tinged with fuscous at the apex. Antennae brown, annulate with pale yellow. *Al. ex.* ½ inch. Sometimes the primaries are sparsely dusted with brown. Season, September.

G. costa-rufella. N. sp.

Second joint of the palpi clavate, not brush-like, brown, tipped with yellowish; third joint pale yellowish. Antennae brown; head, thorax, base of the primaries, and costal margin to beyond the middle, rufous; the remainder of the primaries brown, with four small yellow spots, two of which are on the fold, and two on the disc, and a fifth small one at the beginning of the costal ciliae; ciliae brown, pale at their base. *Al. ex.* a little over ½ inch. Season, September.

G. subruberella. N. sp.

Labial palpi, with the second joint of the palpi, a little thickened before the tip, as in rufusella.

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Pale ochreous, faintly tinged with rufous, streaked and blotched with brick red along the base of the dorsal ciliae; a minute rufous spot on the fold, and a circular brown one at the end of the disc, with a small one before it. *Al. ex.* ½ inch. Season, October. Very near to *rufusella*, perhaps a variety. The palpi are precisely as in that species as to form and colors, but the general hue is much paler.

G. maculimarginella. N. sp.

Second joint of the palpi a little brush-like, yellowish, dusted with dark brown; third joint dark brown, with extreme tip and a few scattered scales white; about as long as the second. Antennae dark brown; head pale ochreous yellow and brown; thorax and primaries dark gray brown, spotted with darker colors; one of the spots is on the costa near the base, and there is a small yellowish spot before it and another behind it, and beyond that is another of the dark spots; there is a dark spot on the fold, with a small yellowish one before it; a small dark spot about the centre of the disc, without any yellow spot before it, and about the end of the disc is another dark spot, with a small yellow one before it. There is a pale yellowish streak at the beginning of the costal ciliae, and an opposite dorsal one. *Al. ex.* ½ inch. Season, July.

G. argenti-albella. N. sp.

Second joint of the palpi scarcely thickened beneath; the third more than half the length of second.

Silvery white; each joint of the palpi has a dark brown annulus before the tip; there are a few blackish scales over the base of the antennae, which are annulate with brown; a small dark brown spot on the extreme costa at the base, followed by three others within the margin, and there is also a small one within the dorsal margin near the base; there is a transverse brown spot or line on the fold, and another at the end of the disc, a brownish fascia at the beginning of the ciliae, and a brownish golden streak around the apex at the base of the ciliae. *Al.* e ⅓ inch. Season, June. A rather pretty and distinctly marked s cies, like *G. variella*, but I think it is quite distinct from it.

G. bidiscomaculella. N. sp.

Pale ochreous, becoming a little deeper towards the apex of the l maries; there is a small brown spot about the middle of the disc,

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another at its end, and a brown streak along the base of the costal ciliae. *Al. ex.* 3/8 inch. Season, July. I have but a single specimen, and in it the palpi are missing. Allied to *subruberella;* perhaps a variety of it.

G. subalbusella. N. sp.

Second joint of the palpi not thickened.

Creamy white, sparsely dusted with ochreous yellow and brown. *Al. ex.* 3/8 inch. Season, July.

G. parvipulvella. N. sp.

Palpi simple.

Pale yellowish white, lightly dusted with fuscous, the dusting more dense towards the apex of the primaries. *Al. ex.* 3/8 inch. Season, May and August. Possibly a variety of *G. subalbusella.*

G. lavernella. N. sp.

Second joint of the palpi a little thickened beneath towards the apex; third joint rather thick.

Palpi ochreous, with the basal half of the second joint and a band before its tip, dark brown; an annulus before the middle of the third joint, and another wide one before its tip, dark brown. Thorax and primaries gray; base of the costal margin dark brown, and from it a narrow, oblique, dark brown streak crosses the wing to the dorsal margin, in its course crossing almost at right angles an indistinct brown line which proceeds from a brown spot on the costal margin, and passes obliquely forwards nearly to the base of the wing; and at the intersection of the lines the brown color spreads around them, forming another spot; these lines are irregular, and in some parts indistinct; behind these lines the wing is densely dusted with fuscous to the tip, and a brown fascia is well indicated at the beginning of the ciliae. *Al. ex.* 1/2 inch. There is something in the clumsy looking palpi and general appearance which reminds one of a *Laverna.*

G. cilialineella. N. sp.

Only microscopically distinguishable from *G. solaniella.* Ochreous, tinged slightly with grayish; there is an indistinct brownish spot on the fold, and another a little behind it on the disc, and another in the apical part of the wing. Costal ciliae whitish, *and a narrow, indistinct, white*

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line at their base, and one also at the base of the dorsal ciliæ, and three dark brown hinder marginal lines in the apical ciliæ. Al. ex. ½ inch.

G. minimella. N. sp.

Palpi simple.

Insect dark brown, indistinctly sprinkled with white. *Al. ex.* ⅜ inch. The neuration is nearly that of *Cleodora*.

ANARSIA.

A. suffusella. N. sp.

Ochreous yellow, somewhat suffused with fuscous. Outer surface of the second joint of the palpi dark brown, tipped with ochreous; third joint pale yellowish. The third joint of the palpi is more slender than in *A. pruniella* Clem., and the fascia is narrower. *Al. ex.* ¾ inch. Season April.

A. trimaculella. N. sp.

Outer surface of the second joint of the palpi dark brown, except at the apex of the tuft, where it is whitish; third joint yellowish. Head pale ochreous; head and thorax pale ochreous, densely dusted with fuscous. Primaries ochreous, suffused and dusted with brown; a small dark brown spot on the fold before the middle; one a little larger at the middle of the disc, and one at its end, and some scattered dark brown scales along the base of the dorsal ciliae, near the apex. *Al. ex.* scarcely ½ inch.

NEDA, *gen. nov.*

This genus is between *Anarsia* and *Cleodora*. It is an *Anarsia* in all but the hind wings, which are those of *Cleodora*, both in form and neuration.

Head smooth, convex; ocelli, none; antennae minutely denticulate; tongue moderate, scaled; labial palpi moderate, second joint with a projecting tuft at the apex; third joint smooth, ascending in the ♀ (all my specimens are ♀.) Primaries lanceolate, ciliae moderate; the costal vein attains the margin before the middle; the cell is narrow and pointed; the first branch of the subcostal is given off before the middle, and there are two other branches towards the end of the cell; the apical branch is

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furcate on the costa before the tip, and has almost a common origin with the apical branch of the median at the end of the cell; the median has three branches behind the middle, and the submedian is furcate at the base. The secondaries are pointed, scarcely as wide as the primaries, with the dorsal margin deeply excavated beneath the tip; the costal margin is excavated from the basal third to the tip; the costal vein attains the margin about the middle; the subcostal is straight to the end of the cell, and thence bends a little upwards to the apex; the cell is very wide; the discal vein oblique, with two branches to the dorsal margin, the upper branch arising close to the subcostal, and the second continued faintly through the cell to the base; the median is trifurcate behind the middle, the first branch remote from the others; the submedian distinct; internal obsolete.

N. plutella.

Third joint of palpi and upper surface of the second one creamy white, the second otherwise dark gray brown; head, thorax and the dorsal margin of the primaries to a point beyond the beginning of the ciliae, creamy white, the primaries otherwise dark gray brown, except that the *extreme* costa is creamy white and the costal margin is obscurely streaked with the same hue. Ciliae of primaries creamy white, except at the apex. *Al. ex.* $\frac{7}{16}$ inch. Season, September. The ornamentation reminds one of a *Plutella.*

CLEODORA.

(No species of this genus has heretofore been described from the U. S. or Canada.)

C. pallidastrigella. N. sp.

Palpi pale yellowish; a spot on top of the third joint, and the brush on the second joint reddish ochreous. Thorax and primaries pale orange; paler, nearly white, along the dorsal margin, and on the extreme costa beyond the middle; a narrow, indistinct, whitish line along the fold, ending at a small brown spot; there is an oblique, narrow, whitish streak along the base of the costal ciliae, continuous with the white of the extreme costa, and there is a short one along the base of the dorsal ciliae; a minute brownish spot surrounded by a pale ring at the end of the disc, and an oblique brownish streak in the ciliae at the apex. The brown spots are all indistinct. *Al ex.* $\frac{3}{8}$ inch.

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The neuration of the primaries differs from that of *C. cytisella*, as figured by Mr. Stainton *(Ins. Brit., v. 3)*, by having a branch from the apical vein to the costal margin, just before the vein becomes furcate, and that of the secondaries differs from it by having a single branch from the discal vein, and the subcostal furcate beyond the cell, or rather the superior branch of the discal is united with the subcostal at the cell. Nevertheless, I have no doubt that this species and the following are properly placed in this genus.

C. palliddla. N. sp.

To the naked eye this species appears very pale gray, almost white; under the lens it appears pale ochreous gray, with minute and indistinct pale fuscous specks; there is a fuscous streak along the upper surface of the second joint of the palpi, and the antennae are annulate with fuscous. *Al. ex.* 3/8 inch. Season, August.

Mr. Stainton, in a foot note on page 111 of his edition of the Clemens papers, doubts whether *Anorthosia* Clem. ought to be separated from *Cleodora*. But the two genera differ decidedly in neuration, and the palpi of *Anorthosia*, as figured by Dr. Clemens, are very different from those of *Cleodora*, as figured by Mr. Stainton *(Ins. Brit., v. 3)*. On the other hand, the palpi of *Anorthosia* resemble more closely those of my genus, *Sagaritis*. In both the tuft rises above the palpal joint, instead of spreading around it, as in *Cleodora*, and in those genera the tuft is composed of long scales, whilst in *Cleodora* it is clothed with stiff, bristle-like scales. In *Anorthosia* the tuft is figured largest at the base of the joint, whilst in *Sagaritis* it is largest towards the apex. The terminal joint in Dr. Clemens' figure is represented shorter relatively to the third than it is in either *Sagaritis* or *Cleodora*. In both these genera the cell is closed in both wings, while in *Anorthosia* it is open. There are also other differences both in the form and neuration of the wings. *Sagaritis* is quite distinct from *Cleodora* in the more elongate and slender body and legs, and more graceful appearance, as well as in the form and neuration of the wings.

NOTHRIS.

N. grisella. N. sp.

Tuft large, but not projecting beyond the end of the joint, its anterior and inferior margins forming almost a right angle with each other; the

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terminal joint of the palpi is nearly as long as the second, recurved; tongue rather scantily and roughly scaled at the base, the scales laterally projecting. Having but a single specimen, I have not examined the neuration, but the palpi are nearly those of *N. vecharcella*, as figured in *Ins. Brit., v. 3*, than to any other genus known to me.

Pale gray; basal half of the second joint of the palpi dark brown on the outer surface; tip of third joint dark brown; basal joint and annulations of the stalk of the antennae brown. There is a rather short dark brown line on each side of the thorax above the wings. Primaries with the extreme costa at the base, and the inner angle, dark brown, and the base towards the dorsal margin suffused with faint reddish yellow; the disc from the base nearly to the middle is suffused with brown, and there are faint brownish streaks between the veins in the apical part of the wing. *Al. ex.* ¾ inch.

HOLOCERA.

H. Clemensella. N. sp.

H. chalcofrontella Clem. is so variable a species that it is possible this may be a variety of it; but it is not one of the described varieties.

Whitish, dusted lightly with dark purplish brown, the dusting dense on the second joint of the palpi. There is a purplish brown patch at the base of the costa, a small one about the middle of the costa, a small one opposite to it on the fold, a small one on the disc opposite the space between the other two, one at the end of the disc, and a row of small dots around the apex at the base of the ciliae. *Al. ex.* ½ inch. Season August.

POLYHYMNO, *gen. nov.*

The two insects for which I erect this genus are possibly not congeneric. *P. luteostrigella* is a slender, elongate insect, whilst *P. sexstrigella* is rather robust; there is but a single specimen of the latter species, and the head of that is wanting, though it is otherwise perfect. The form and neuration of the secondaries is very nearly the same in both, and so is the form of the primaries, except that those of *sexstrigella* are a little wider. The generic diagnosis is that of *luteostrigella.* The points in which *sexstrigella* differ from it are noticed under that species. The form of *luteostrigella* and the markings of the wings in both species are suggestive

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of affinities with *Gracilaria*, especially the short streaks at the apex of the primaries, reminding one of the "hook" in some species of that genus. The palpi are rather suggestive of relation to *Cosmopteryx* or *Stathmopoda*, but the form and neuration of the wings place it beyond doubt in the *Gelechidæ*, though the caudate primaries are peculiar.

No maxillary palpi; labial palpi recurved, very long and slender, with the third joint longer than the second, and pointed; tongue long, scaled at the base; forehead convex; face broad; scales of the head and face appressed; basal joint of the antennae small, scarcely distinguishable from the stalk, which is long and slender.

Primaries lanceolate, narrow, caudate, the costal and dorsal margins both being excised before the tip, behind the cell, the dorsal margin deeply so, and the extreme tip is a little hooked backwards. The costal vein is short, cell narrow; the subcostal gives off two branches, both behind the middle, the first remote from the second, which is at the end of the cell; and the apical branch is furcate behind the cell, both branches going to the costal margin. The discal vein gives off a single branch, which goes to the dorsal margin, and the median is four-branched, all four at or near to the end of the cell; the submedian is furcate at the base.

The secondaries are deeply emarginate beneath the apex, which is a little hooked backwards; the subcostal gives off a long branch from before the middle, and is furcate, with one branch to the costal and the other to the dorsal margin before the tip; the cell is unclosed, and the independent discal branch arises *at* the median, which is three-branched, the first one being before the middle and remote from the others. They are about as wide as the primaries.

The neuration of the secondaries allies this genus to *Trypanisma* Clem., *Taygete*, *Evippe*, &c., Cham.

P. luteostrigella. N. sp.

Silvery white; ciliae pale stramineous; upper surface of the thorax, with four narrow, equidistant, longitudinal, golden yellow lines. Primaries with three similar golden yellow lines extending through the entire length of the wings; one of these is placed just within the dorsal margin, and is continuous with one of the central thoracic lines, but the line is very indistinct, becoming more distinct towards the apex; another of the lines on the wing is continuous with one of the lateral thoracic lines, is very

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distinct, becomes furcate on the disc, one branch going to the extreme apex and the other towards the dorsal margin at the beginning of the ciliae, where it becomes confluent with the first mentioned line, but immediately separates from it again, the two lines continuing on parallel to each other around the base of the dorsal ciliae to the apex. The third line begins on the costa at the base, and runs just within the costal margin nearly to the apex, where it becomes confluent with the second or apical branch of the second or median streak. In the apical part of the wing are three golden costal streaks, which become confluent with the second and third longitudinal lines, and point obliquely backwards, the first being rather remote from the other two; behind these three streaks is a fourth one, perpendicular to the margin; behind this is a fifth, pointing obliquely forwards, and behind this again two short curved ones, pointing forwards, one at the apex and the other close to and before it. There are two distinct, though small black spots in the dorsal ciliae. *Al. ex.* 3/8 inch. Season, August.

Polyhymno? sexstrigella. N. sp.

As already stated, the head is missing in the single specimen which I possess of this species, and the primaries are wider, decidedly so in proportion to their length, being a little wider than the secondaries, and the costal margin before the tip is not so decidedly scalloped; the tip is not hooked backwards; the apical branch of the subcostal is not furcate; there are three branches before it, instead of two, as in *luteostrigella*, but the last one has almost a common origin with the apical, and the median is only three-branched, instead of four.

The secondaries are the same, except that in this species the long branch of the subcostal (the first branch) is absent.

The insect is more robust than *luteostrigella.*

Iridescent fuscous, in some lights silvery. About the middle of the primaries is an oblique, wide, silvery white costal streak, of irregular outline, reaching the fold, pointing obliquely backwards, divided in part by a narrow yellowish line, which passes back along the middle of the wing to the second costal streak, the wing above and below it being dark fuscous, somewhat iridescent; the second costal streak is white and placed behind the middle; opposite to it is a white spot, just within the dorsal margin; the second streak is dark margined behind, and the dark margin is produced backwards as a line along the centre of the apical part of the wing, but does not quite reach the apex, and nearly opposite its end are two

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small, straight, silvery white costal streaks, both dark margined behind and close to each other; behind these two streaks are two others, also close together, the last one at the apex and both dark margined behind. The apical part of the wing (behind the second costal streak) is golden yellow, sprinkled towards the dorsal margin with brown. Ciliae silvery fuscous, with a wide, dark brown hinder marginal line. *Al. ex.* 3/8 inch. Season, July.

In the form and neuration of the wings, and in the disposition of the costal streaks it *approaches luteostrigella;* whether it does in the palpi and antennae remains to be seen.

Since the above remarks were written, I have received from Mr. Belfrage more perfect specimens, and find the palpi and antennae as in *luteostrigella.* It may be necessary to amend the specific description a little hereafter.

(To be Continued.)

ON A NEW SPECIES OF CERAMICA.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Ceramica rubefacta (nov. sp.)

Expanse, 41 m. m.; length of body, 20 m. m.

Eyes hairy; collar and thorax reddish brown; the thorax of my only specimen was injured in capture, so that the presence, or if present, the size of the tufts could not be ascertained. But apparently it was tufted, as there are traces of a meta-thoracic elevation. Abdomen yellowish, with a strong basal tuft; the labial and anal tufts tinged with carneous; beneath red; anterior wings deep uniform red; lines obsolete; nervules distinctly black; a white dot on the costa at the base; the interior line is only represented by a white dot on the costa and on the subcostal, median and submedian nervures. The orbicular is blackish, small, oblique and with a grayish centre, situated close to the reniform, and at more than the usual distance from the base; reniform vague and blackish, with a gray

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centre; the exterior line consists of faint white dots on the nervules, and its course is marked by the slightest possible change of color between the median and subterminal spaces; the ante-apical white dots are very distinct; the subterminal line wanting, except at the costa, where several linear white shades show its place. Posterior wings yellowish white, with a broad fuscous terminal border; beneath the anterior wings are gray, with traces of an exterior line; the apical, costal aud terminal regions deeply suffused with carneous. Posterior wings whitish, with the fringe yellow; the costal and apical portions of the wings carneous. *Hab.* Malden, Mass.; from my collection. Found under bark, June 24, 1873.

In a recent paper, Mr. Grote refers *Ceramica* to *Taeniocampa*, being then only acquainted with *Ceramica picta* Harr. The discovery of this species, which agrees perfectly in structural characters with *picta*, confirms my previous opinion that the genus should be recognized. The characters which separate it from *Taeniocampa* are not very striking, but they can be readily appreciated, and the habits and markings of the two species are very different from any of the *Taeniocampas*. *Rubefacta* approaches to the description of *vindemialis* Guen., but differs in the presence of the orbicular and in other particulars.

In a recent number of the ENTOMOLOGIST Mr. Grote described a species under the title of *Perigrapha normani*. In working on allied genera, we have identified this form, but we are unable to see the propriety of the generic reference.

The following are the characters of Lederer's genus *Perigrapha*:

Eyes hairy; tibiae unarmed; antennae pectinated in both sexes; collar cut out and produced in front into a sharp corner: thorax with an angular projection on each side, and bearing behind the collar a lofty, sharp-edged, longitudinal crest; abdomen with a closely cut tuft on the first segment.

In the species under consideration the antennae in both sexes are simple; the collar is not produced into a sharp corner; the thorax is rounded, without angular projections on the sides. Behind the collar there is simply a small, flat, furrowed tuft, instead of a lofty crest; the abdomen is untufted.

Such being the generic characters of *normani*, we remove it from *Perigrapha* and refer it to a separate section of *Taeniocampa*, as it agrees with the typical species of that genus, except in the possession of a slight prothoracic tuft. The known species will now stand as follows

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Taeniocampa Guen.

Section 1.—Thorax untufted.

Alia Guen.

Oviduca Guen.

Pacificata Harvey.

Section 2.—Thorax with a weak, flat, furrowed tuft behind the collar.

Normani Grote.

ON THE SPECIES REFERRED TO ORTHODES BY GUENEE.

BY H. K. MORRISON, CAMBRIDGE, MASS.

In Mr. Grote's recent "List of the Noctuidæ" four of the five species described by Guenée are marked unidentified. With a very large material (nearly 100 specimens of the different species, for many of which we are indebted to Mr. F. C. Bowditch, who has found them common in the vicinity of Boston) before us, we have attempted to straighten out the species and to characterize the two genera to which we refer them.

Mr. Guenée, in instituting this genus, comprised under it many discordant forms, and in his preliminary remarks he forsees the necessity of a future generic separation of the species.

We restrict Orthodes to the group of which *infirma* is the type, and also the most widely known member.

ORTHODES Guen., Noct., vol. 1, p. 371 (1852.)

Imagines of medium size. The eyes hairy; antennæ simple in both sexes; the palpi stout, erect, thickly but evenly clothed; the terminal joint short, but distinctly separated from the other two; the collar rounded, distinctly lobed, and well separated from the thorax; in *infirma* there is an open space between the two lobes. The thorax untufted, its villosity smooth and pressed down; the abdomen untufted, in the female slightly exceeding the posterior wings; in the male long hairy tufts which have their origin at the base of the genitalia, enclose and extend far beyond the parts; the anterior wings rapidly increasing in width from the base outward, triangular, the apex and internal angle rounded. The spots and lines are very clear and evident. Beneath, the males have on the median space an irregular, slightly raised patch of closely compressed hair.

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SPECIES.

Infirma, Guen., Noct., 1, p. 375 (1852).

In this species the squamation is smooth; the lobes of the collar are separated below; the thorax is concolorous; the anterior wings are dull purple gray; the lines and spots are all present, with the exception of the claviform spot, and accompanied by distinct, even, yellow lines; the half-line parallel with the interior line; the median lines are trapezoidal; the median shade is blackish, diffused, and curved, passing between the spots; the reniform and orbicular are large, contiguous, and surrounded by pale annuli; a double row of spots on the nervules follow the exterior line: the subterminal line is distinct, even and slightly curved; the subterminal space dark, particularly near the costa; a pale scolloped line at the base of the wings. Beneath yellowish, with a common line; on the anterior wings the characteristic patch of hair is more elongated and narrower than in the allied species; on the posterior wings discal dots.

Expanse, 32–35 m. m. *Hab.*, the Eastern and Middle States. I have also received specimens from St. Louis (Prof. C. V. Riley.)

This species is very constant, except that the ordinary spots differ in their closeness to each other. It is extremely common in the Middle States in July; to the northward it becomes less abundant.

Cynica Guen., Noct., 1, p. 375 (1852).

Nimia Guen., id., p. 76; *candens* Guen, id.

♂ . . . . The collar rounded, well separated from the thorax; there is no open space between its two lobes. It varies greatly in color from light ochreous through all the shades of reddish and purple brown. The thorax concolorous with the anterior wings; the latter are rounded, proportionately shorter than in *infirma*: they vary from gray, with scarcely any red admixture, to deep reddish brown. The median lines are always present, simple, black and irregular, accompanied by paler shade lines; their position in reference to each other varies in different specimens in some they are trapezoidal, in others they are almost sub-parallel, and they vary to infinity between these two limits. The median shade is black, diffused and arcuate, always touching the base of the reniform, and approaching more or less near to the exterior line. The ordinary spots are always distinct, concolorous, with white annuli; they vary in their distance from each other. The orbicular is usually oblique, and but little smaller than the reniform: in

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one specimen, however, it is round and very small. The subterminal line is generally whitish, distinct, and preceded by a dark shade line; this latter is sometimes absent. The posterior wings are uniform, fuscous, slightly lighter at the base, with a faint discal dot; the fringe tinged with ochreous or carneous, or with a shade between them. Beneath the anterior wings are gray, the apex sometimes carneous. The characteristic patch of hair covers the upper part of the basal and median spaces. The posterior wings are yellowish, with a discal dot and thick median line; the latter is rarely obsolete. The fringes of both wings vary; they are usually carneous, but sometimes ochreous or even pale gray. The anal tufts are usually yellowish.

Expanse, 30 to 33 m. m.

♀. In the female the collar is purple, tipped with ochreous; the thorax and anterior wings are never gray, or with any trace of ochreous, neither are they reddish brown, as in the males; they are usually of a dark intense purple brown. The median lines vary as in the males, but they are always less distinct; the ordinary spots are usually present, as in the males, but in one specimen they are barely traceable. The subterminal light line is less distinct, and frequently entirely obsolete. The posterior wings are as in the males; beneath also varying as in the other sex.

Expanse, 29 to 32 m. m. *Hab.* Maine, Mass., N. Y., Ohio; St. Louis, Mo. (Prof. C. V. Riley). Appearing in the latter part of June and first of July.

We have no hesitation in referring *nimia* as a synonym of this species, as specimens from New York exactly correspond with Guenée's description. *Candens*, however, may be distinct; but we are disposed to consider it merely a variety, from the description; at least until it is discovered and proved to be a good species.

PSEUDORTHODES *(nov. gen.)*

Closely allied to Orthodes, but we think sufficiently distinct from it. The anterior wings are narrower than in Orthodes, and lack the distinctive sexual patch of closely compressed hair of the males. The markings are confused, and the ordinary spots are obsolete. The males have not the long anal tufts found in Orthodes. The third palpal joint is longer and better defined.

Vecors Guen., Noct. 1, p. 376 (1852.)

Var. *griseocincta* Harvey, Bull. Buff. Soc. Nat. Sci, 1874.

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In this species the thorax is concolorous with the anterior wings; the abdomen is smooth and flattened; the wings are usually reddish brown or gray, lustrous; the median lines are blackish and confused, often accompanied by pale, faint shade lines; the interior line is slightly oblique and sometimes geminate; the median shade is broad, black, arcuate, and diffused, touching the reniform, which is reduced to a red or white spot. The orbicular and claviform are absent. The exterior line is always simple and denticulate; the subterminal line is faint, light, preceded very frequently by a dark shade, in which are sometimes formed, opposite to the cell, black cuneiform dots. The fringe is concolorous. Posterior wings dark grayish fuscous, sometimes almost black. The discal dot is always present. Beneath the anterior wings are dark gray, with the terminal space usually light; the posterior wings lighter, with a distinct discal dot. A common median line extends over both wings.

Expanse 25 to 32 m. m. *Hab.* Atlantic States.

Nearly forty specimens were examined from different localities.

O. cynica can be justly called a variable species, but this one is infinite in its variations of size as well as color. We can not consider *griseocincta* other than a specimen in which the reddish tint is entirely absent, and the gray shades accompanying the lines are unusually prominent. The forms of this species slide so gradually into each other that it is impossible to draw distinct lines of demarcation. There are, however, two principal varieties; in one the reniform is clear, white and conspicuous, and the ground color is reddish; in the other the reniform is reddish, or indicated only by a few pale scales, and the ground color is gray with but slight reddish admixture. Specimens of this latter variety (which is the only one described by Guenée) sometimes occur in which the ground color is red, but it is more frequently the other way.

In one specimen expanding only 25 m. m., the reniform is white; the ordinary lines are diffused and black, coloring the whole wing, and entirely obscuring the usual reddish shade. In another, which approaches *griseocincta*, the expanse is 31 m. m.; the reniform is simply a few collected whitish scales. The lines are nearly obsolete, and the interior line is preceded by a faint pale shade band. The ground color is a dull lustrous slightly brownish gray.

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Obituary.

The sad intelligence of the death of that distinguished Entomologist, Francis Walker, of London, England, conveyed in a brief notice in our last, will, we know, have brought grief to the hearts of all those who have been favored with the correspondence of that genial-hearted man. His continued and disinterested kindness towards all those with whom he had to do has endeared him to many. Although we never had the pleasure of a personal acquaintance with the deceased, yet to ourselves personally, as well as to our Society, he has always been among the truest and kindest friends we have had, ever ready to do us any service in his power. His death leaves a void in our circle which it will be hard to fill. The following brief sketch of his career and his unceasing labors, written by one who knew him well, will be read with interest:

"It has become my painful duty to record that Francis Walker, the most voluminous and most industrious writer on Entomology this country has ever produced, expired at his residence, Elm Hall, Wanstead, on the 5th of October, 1874, sincerely lamented by all who enjoyed the pleasure and advantage of his friendship. He was the seventh son, and the tenth and youngest child, of Mr. John Walker, a gentleman of independent fortune, residing at Arno's Grove, Southgate, where the subject of this memoir was born on the 31st of July, 1809. Mr. Walker—the father—had a decided taste for science, especially Natural History; he was a fellow of the Royal and Horticultural Societies, and vice-president of the Linnean, so that his son's almost boyish propensity for studies, in which he afterwards became so eminent, seems to have been inherited rather than acquired.

Mr. Walker's decided talent for observing noteworthy facts in Entomology was first exhibited at home, when, as a mere child, his attention was attracted by the butterflies, which, in the fruit season, came to feed on the ripe plums and apricots in his father's gardens; *Vanessa C-Album* is especially mentioned; and *Limenitis Sibylla*, another species no longer found in the vicinity of London, was then common at Southgate.

In 1816 Mr. Walker's parents were staying with their family at Geneva, hen the centre of a literary *coterie*, in which they met, among other celebrities, Lord Byron, Madame de Stael, and the naturalists De Saussure and Vernet. They spent more than a year at Geneva and Vevey, and in 1818 proceeded to Lucerne, from which place Francis, then a boy nine

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years of age, made the ascent of Mont Pilatus, in company with his elder brother Henry; their object, in addition to the ever delightful one of mountain-climbing, being the collecting of butterflies. The family afterwards visited Neuwied, and returned to Arno's Grove in 1820.

In 1830 the two brothers, Henry and Francis, again visited the Continent, and now it was purely an Entomological tour, the late Mr. Curtis, the well-known author of 'British Entomology,' being their companion. This party collected most assiduously in the island of Jersey, and afterwards at Fontainebleau, Montpellier, Lyons, Nantes, Vaucluse, &c., the French Satyridæ, of which they formed very fine collections, being their principal object.

Mr. Walker's career as an author commenced in 1832. He contributed to the first number of the 'Entomological Magazine,' the introductory chapter of his 'Monographia Chalciditum,' a work on the minute parasitic Hymenoptera—a tribe of insects which he ever afterwards studied with the most assiduous attention, and one on which he immediately became the leading authority. He was then only twenty-three years of age; but his writings exhibited a depth of research and maturity of judgment which have rarely been excelled, and which abundantly evince the time and talent he had already devoted to these insects. It is worthy of notice that he now descended from the largest and most showy to the smallest and least conspicuous of insects, doubtless feeling that whereas among the magnificent butterflies there was little opportunity for the discovery of novelties, among the Chalcidites everything was new—everything required that minute, patient, and laborious investigation in which he seemed so especially to delight. Only two authors, Dalman and Spinola, had preceded him in devoting their attention to the structure of these atoms of creation; and even these two had described comparatively a very small number of species.

In 1834 Mr. Walker, somewhat reluctantly, consented to undertake the editorial management of the 'Entomological Magazine,' and resigned this office the following year, yet continued a constant contributor to its pages. The same year he visited Lapland, in company with two of our most distinguished botanists; and in this extreme north of Europe, and especially at Alten and Hammerfest, he assiduously collected insects, more particularly the northern Diptera, the Satyridæ among Lepidoptera, and the Chalcididæ amongst Hymenoptera. During this journey we have the first and only notice of his prowess as a sportsman: he shot wild grouse

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and ptarmigan; and on one solitary occasion was accessory to the death of a reindeer, but as other rifles besides his own were simultaneously discharged, it is difficult to say whose was the effective bullet. I am glad to be able to record that Mr. Walker declined to give the poor creature the *coup de grâce*, and, for this especial purpose, resigned to another his *couteau de chasse*.

In May, 1840, he married Mary Elizabeth, the eldest daughter of Mr. Ford, of Ellell Hall, near Lancaster, and spent the summer on the Continent, again collecting in Switzerland with his customary assiduity.

In 1848 he explored the Isle of Thanet, the following year the Isle of Wight, and succeeding years, 1850 and 1851, he visited Geneva and Interlachen; and during the former year commenced his great work on Diptera. This formed part of a projected series of works on British insects, to be called 'Insecta Britannica,' a project in which the late Mr. Spence took a deep interest.

During the year 1851 was published the first volume of the 'Diptera.' This work is printed in 8vo., and contained 314 pages; the second volume appeared in 1853, and contained 298 pages; and the third volume in 1856, and contained 352 pages. Thus the entire work comprised nearly 1000 pages of closely-printed descriptions.

Another tour on the Continent occupied a considerable portion of 1857, Mr. Walker visiting Calais, Rouen, Paris, Strasbourg, Baden-Baden, Heidelberg, Wiesbaden, Frankfort, Mayence, Cologne, Brussels, Aix-la-Chapelle, and Antwerp. During the journey he collected in the Black Forest; and this is the only scene of his scientific labours, during the tour, of which I have any intelligence.

The summer of 1860 was devoted to a thorough exploration of the Channel Islands. Dr. Bowerbank was his companion during a portion of the time, and, as a consequence, the sponges of these islands were a main object of research—the Gouliot caves in Sark, so celebrated for their marine productions—were a great attraction to both naturalists.

In 1861 Mr. Walker's excursions were chiefly confined to North evon; he visited Linton. Clovelly, Ilfracombe, Bideford, and Barnple: and now his attention seems to have been again chiefly occupied h Lepidoptera, at the scarcity of which he was greatly disappointed, ving expected, from the extensive woods, to have found moths particurly abundant.

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In 1863 he toured the English lakes; and, in the spring of 1865, North Wales and Ireland; and in the autumn he again visited Paris, Geneva, Lucerne, Interlachen, and Altdorf, ascending the Righi, Mont Pilatus and the Mürren, and proceeding to Kandersteg, the Oeschinen See, and the Gemmi Pass.

In 1867 we find him again in France and Switzerland, ascending the Col de Voza, and examining the Jardin of the Mer de Glace; thence over the Tête Noir to Martigny, Sion, and the Great St. Bernard; returning by St. Maurice and the Villeneuve to Geneva.

In 1869 he made the tour of the Isle of Man, and returned by Holyhead; in 1870 he paid another visit to Llanberis, as well as to all the more beautiful scenery in North Wales, crossing over to Ireland, and touring that island from south to north; and in 1871 he examined Entomologically the Scilly Islands, and the districts of the Lizard and the Land's End.

In 1872 he turned his attention to Italy, visiting Rome, Piza, Lucca, Florence, Naples, Sorrento, Capri, Milan, and Venice, as well as the Lakes of Como and Maggiore.

And, finally, in the present year, he had again proceeded as far as Aberystwith, on his way to Ireland, when his intention was frustrated by illness, which terminated fatally on the 5th of October. He died in the most perfect peace of body and of mind. For many years Mr. Walker was a member of the Linnean and Entomological Societies of London, but resigned his membership in both some time before the close of his life.

It might be excusable in a man of such incessant bodily activity—so locomotive by inclination, so devoted to the study of Nature in all her aspects, so dilligent a collector of the objects of his favourite study—had he allowed his pen to rest while his hands were engaged in forming and arranging his collections. But this was not the case with Mr. Walker, as his Catalogues of the National Collection abundantly testify. Of the Lepidoptera Heterocera, alone, Mr. Walker catalogued and described upwards of twenty-three thousand species; in addition to which he prepared similar catalogues, although perhaps not to the same extent, of the Diptera, Orthoptera, Homoptera, Neuroptera, and part of the Hymenoptera: such an amount of labour, as is testified by these catalogues, has seldom, if ever, been accomplished by one individual. But this statement by no means represents the whole of his literary labours. He contributed

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shorter or longer papers to the Transactions of learned societies, and to the periodicals of the day, especially to the 'Zoologist' and 'Entomologist;' by the indexes of the latter I find he sent thirteen communications to the first volume, three to the second, one to the fourth, thirteen to the fifth, and forty-three to the sixth; during the present year his writings appear in every number. I intended to catalogue these and his other labours, to give some idea of the number of pages, number of species and dates of each; but I can scarcely now venture to look forward to the accomplishment of this labour of love.

A word remains to be spoken of the man apart from the scientific and accomplished naturalist. Throughout my long life I have never met with anyone who possessed more correct, more diversified, or more general information, or who imparted that information to others with greater readiness and kindness; I have never met with any one more unassuming, more utterly unselfish, more uniformly kind and considerate to all with whom he came in contact. It is no ordinary happiness to have enjoyed the friendship of such a man for nearly half a century.—*Edward Newman in The Entomologist.*

CORRESPONDENCE.

ON CIRRŒDIA PAMPINA Guen.

DEAR SIR,—

In the list of the North American Noctuidæ published in the Bulletin of the Buffalo Society of Natural Sciences, we find the familiar name of *Cirrædia* Guen. replaced by *Aethimia* Hubn. We are unable to see the necessity of this change. *Aethimia* was founded by Hubner in the *Verzeichniss* (1816) on

x crampelina Hb.
ambusta W. V.
subusta Hb.

Guenée, in his "*Essai sur les Noctuèlites*," printed in the Annals of the French Entomological Society for 1839, p. 489, takes out *x crampelina*, which is congeneric with our *pampina* as well as the European *ambusta*, placing it in the genus *Cirrædia*. In 1852, the same author in the "*Species Général*," vol. 6, p. 12, defines *Athetmia* (which he spells as in the index, not the text of the "*Verzeichniss*"), referring *subusta* as the typical

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species, and adding another, *inusta*, to the genus, both of these species being native in South America.

This being the synonymy of the two genera, we would retain *Cirrœdia* for our well known form. H. K. MORRISON, Cambridge, Mass.

BOOK NOTICES.

Manuscript Notes from my Journal, or Illustrations of Insects, Native and Foreign Diptera, by Townend Glover, Washington, D. C.

We sincerely thank the author of this valuable work for his great kindness in placing us on the list of the favored few among whom the first small edition of forty-five copies of the above work has been distributed. This work is unique in several respects. It is a fac simile of the author's own note book on this family of insects, written by the author himself on prepared paper, then transferred to stone and printed on a lithographic press. The costliness of the paper required for this purpose and the fact that it can only be used on one side, adds much to the expense of issuing this work, which expense has been borne entirely by the author. Such generosity and disinterestedness in the interests of our favorite science is deserving of the highest commendation.

The work is published in quarto form, and opens with three pages of introductory matter, followed by thirteen plates, containing no less than 480 excellent illustrations of Dipterous insects in their various stages, or of parts of these insects, accompanied by suitable explanatory lists of names, &c. The labor on these plates alone, all of which is the work of this pains-taking and laborious Entomologist, is something enormous, and this, to our knowledge, is but a fraction of the work he has accomplished in this department during the past few years. The next 59 pages are occupied by an alphabetical list of the families and genera of Diptera, with synonyms, habitat, food, &c. Then a list of predaceous or parasitic Diptera; vegetable and animal substances inhabited, injured or destroyed by Diptera, &c., &c. A valuable practical portion of the work is the enumeration and description of various remedies which have been suggested to guard against the injuries caused by these insects. Each division of the work throughout is arranged alphabetically and in the most convenient manner, so as to enable the student to refer readily to any portion he may desire.

Notices of other books received will appear in our next.

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OUR SEVENTH VOLUME.

With the present issue we enter upon the seventh year of our existence. On looking back over our past career, we see abundant reason for thankfulness and encouragement; from small beginnings we have grown to a respectable sized periodical, while in mechanical execution, typography, paper, &c., we give precedence to none. The completion of our past volume and the advent of the present number have been delayed by untoward circumstances beyond the time intended, but we are making a fresh start now, and hope by persevering effort to catch up lost time and issue regularly hereafter. To meet the wishes of several of our friends who desired to have certain material printed before the close of the sixth volume, we published last month a double number, consisting of forty pages with index added, so that our readers have been dealt with more liberally than we had promised, having received a volume of 260 instead of 240 pages. Many kind friends have helped us in the past with their contributions, and we gratefully observe that the number of helpers is increasing, as is shown by the recently issued list of contributors to the sixth volume; we trust that none of these will weary in well-doing, but continue their needed assistance and enlist their friends as far as possible in the same service. Original observations on the habits and life history of insects are especially desired, to make our journal still more useful and interesting. With the kind aid of our coadjutors, we shall endeavor to continue the papers on our common insects, which will, as heretofore, be accompanied by suitable illustrations, and shall, as far as possible, provide in each issue other material which will interest the general reader.

We would also take this opportunity of reminding our subscribers that subscriptions for the new volume are now due, and will be thankfully received by the Secretary, Mr. J. H. McMechan, London, Ont. It is with pleasure, also, that we inform our many correspondents that by the recent postal arrangements entered into by the United States and Canadian authorities, all letters mailed after the first of February will require a three cent stamp only to carry them from any part of the States to any part of Canada and *vice versa*, instead of six cents, as heretofore; post cards also will pass from one country to the other without the additional stamp.

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CATOCALA NEBRASKÆ, DODGE.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Expanse, 2.70 inches. Primaries scalloped, apparently brown, being densely sprinkled with black scales on a reddish gray ground. Reniform tinged with red, clouded anteriorly with black, and having a black central spot. Sub-reniform indistinct. Terminal line nearly obsolete, the grayish band which precedes it showing plainest on the costa. All the transverse lines are black, and a curved row of seven black dots appears on the interspaces along the outer margin. Fringe dark, tipped with white.

Secondaries red, of about the same shade as appears in *C. parta*. Median band not much curved, and of nearly the same width as appears in *C. unijuga*, excavated anteriorly at the extremity of the discal cell, slightly constricted just after crossing the first median venule, and ends abruptly at the submedian vein; a few scattered scales appear beyond. Marginal band of medium width; even on inner edge, excavated opposite the termination of the median band, and ends about half way between the submedian and internal veins. Apex white, tinged with red.

Fringe white, spotted with black, which color predominates at the anal angle. Thorax same color as primaries. Abdomen clear brown, three of the segments tipped with white. Beneath, the general appearance much as in allied species. Median band of secondaries ends at submedian vein.

Taken at Glencoe, Dodge County, Nebraska, in August, 1874. Mr. Grote informs me that this species seems to be related to *Catocala Californica*.

NOTE ON CATOCALA NEBRASKÆ, BY A. R. GROTE, BUFFALO, N. Y.

Mr. Dodge has sent me a specimen of this species, recently discovered by himself. It is closely allied to the European *C. nupta*. It differs by the greater obliquity of the t. p. line and the shallower submedian sinus. The fore wings are otherwise quite similar in color and design, while the lines are more deeply black marked in *Nebraskæ*. The hind wings differ by the greater narrowness of the terminal band, and notably by the narrower, more rounded and non-angulated median fascia. The species seem to be related somewhat as *C. elocata* of Europe and *C. Walshii* of

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North America. Perhaps it is this species *(C. Nebraskæ)* that has led Mr. Strecker (who has shown himself on other occasions to be inexact) to record "*C. nupta*" as being found in North America. I will remark here that Mr. Strecker's statement that the Californian species of *Nemophila* are identical with the European *Russula*, is contradicted by their description as distinct by Dr. Boisduval, who should be well acquainted with the variations of the European form. The statement that *Eupsychoma geometrica* is the exact equivalent of Mr. Walker's *N. petrosa*, made by Mr. Strecker, is erroneous, and is probably a careless rendering of Dr. Packard's previous statement that the two were probably forms of the same species. In *geometrica* the hind wings are entirely *black;* in *petrosa* (the type of which I saw in the British Museum) the hind wings are *white* or *yellowish*, with black markings. In my opinion it will eventuate that we have several species of *Nemophila* in our Western regions, none of them identical with *plantaginis*, and probably some of them (i. e. *Eupsychoma geometrica*) to be distinguished structurally, and therefore generically from *caespitis* and *cichorii* and *plantaginis*.

CAPTURES OF NOCTUIDÆ AT ST. CATHARINES, ONT.

BY GEO. NORMAN, ST. CATHARINES, ONT.

In the spring of this year I commenced collecting the *Noctuæ* of this part of Canada, and in the hope that a list of my captures, with the dates of appearance, may be of interest, I venture to send the same for publication.

Being a stranger to the insect fauna of N. America, and in the absence of anything like a manual of the Heterocera, I should, even with the assistance of the Brit. Mus. Catalogues and Guenée's work, have had great difficulty in identifying my specimens. Fortunately this difficulty was removed by Mr. Grote, of Buffalo, who, in the kindest manner, has from time to time named my material. For this courteous assistance I am under lasting obligations. I have thought it advisable not in all cases to adopt the genera of Mr. Grote's "List of N. American Noctuidæ," for in the unsettled state of nomenclature at present existing, I prefer the arrangement of M. Guenée. This I, moreover do, for reasons not neces-

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sary here to mention. It will be observed there are in my list several species, and even some genera, hitherto new to science; these have in nearly all cases been published by Mr. Grote in various journals. Many of the Homopteridæ I have omitted altogether, as it seems hopeless to identify them by the meagre descriptions existing. Finally, Mr. Grote has several specimens yet undetermined, which will have to be added to the list.

Thyatira cymatophoroides—14th July; at sugar; not common.

———*expultrix*—23rd June to July; not common.

Raphia frater—25th June; rare; at sugar.

Acronycta occidentalis—2nd June to August; common; at sugar and at rest.

———*morula*—10th July; rare; at rest.

———*connecta*—12th August; rare; at sugar.

———*hastulifera*—26th June; not common; at rest.

———*dactylina*—24th July; rare; at sugar.

———*brumosa*—17th May to August; at rest and at sugar; not uncommon.

———*Verrilli*—20th July; rare; at sugar.

———*noctivaga*—6th June to August; rare; at light and at sugar.

———*superans*—25th June and July; not unfrequent; at sugar.

———*ovata*—18th June; bred; rare; at sugar.

———*subochrea*. *N. sp.*—2nd July; rare; at sugar.

———*dissecta*—17th June; two specimens at rest.

———*oblinita*—26th May; rest; very frequent; a second brood in August; cocoons frequent on palings.

Bryophila lepidula—19th July; rare at sugar.

———*palliatricula*—29th June; frequent; at rest and at sugar.

Noctua sigmoides—29th June to August; not unfrequent; at sugar.

———*augur*—3rd July; common; at sugar.

———*baja*—3rd August to September; very common; at sugar.

———*C. nigrum*—11th June to September; very common; at sugar and light; specimens larger than in Europe.

———*bicarnea*—31st July to September; very frequent; at sugar and at lime blooms.

———*Normaniana*. *N. sp.*—21st July to September; frequent; at sugar. This has hitherto been, I believe, considered the same as *N. triangulum*. I am reminded much more of *N depuncta*, which seems its nearest ally.

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Noctua clandestina—19th June to July; common; at sugar and lime blooms.
——— *brunneicollis*—2nd July to September; rare; at sugar.
——— *alternata*—1st July to September; very common; at sugar.
——— *cupida*—17th July to August; frequent; at sugar.
——— *rubi?*—4th August; rare; at sugar.
Agrotis herilis—31st July to September; very common; at rest, sugar and light.
——— *tricosa*—3rd August to September; very common; at rest, sugar and light.
——— *subgothica*—9th August to September; not so frequent as the above two species; at rest, sugar and light. All three species in abundance on flowers of Thistle *(Cirsium arvense)* and unexpanded flowers of *Verbascum thapsus.*
——— *fennica*—10th August; one specimen at rest in the Montebello Gardens.
——— *gladiaria. N. sp.* Morr.–Sept. 5th; not unfrequent at sugar and light.
——— *tesselata*—29th June; bred from larva found in abundance at the roots of *Malva rotundifolia* in May; afterwards to 2nd of July, swarming; at sugar, rest and at lime blooms. Many remarkable aud beautiful varieties.
——— *Cochrani*—27th July; bred afterwards; common; at sugar and rest to September.
———*saucia*—14th August; not uncommon; at sugar.
——— *suffusa*—2nd June to October; swarming at sugar, flowers and light.
——— *venerabilis*—6th September; not uncommon; at light and sugar; also bred.
Aplecta pressa. N. sp—6th July; lime blooms and at rest; several.
——— *herbida*—27th June to September; common at rest; less frequent at sugar.
——— *nimbosa*—6th August; rare; at sugar.
——— *latex*—30th May to June; not uncommon; at rest.
Ammoconia badicollis—31st July; rare; at sugar.
Hadena subjuncta—2nd July; rare at sugar.
——— *vicina. N. sp.*—4th June; rare at sugar.
——— *confusa*—8th May; rare at palms.

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Hadena albifusa—5th June to August; common at rest, flowers and sugar.
——— *claviplena*—9th July; rare at sugar.
——— *xylinoides*—23rd May to June; common at rest and at sugar; a second brood in August, smaller in size.
Dianthoecia meditata—11th August; not rare at sugar and at rest.
Mamestra arctica—22nd June to August; swarming at rest, and at sugar and lime blooms; also at light; bred from warty larvæ found under stones in May.
——— *devastator*—24th June to September. By far the most common moth here; a perfect nuisance at sugar.
Apamea jaspis—30th May to July; common at rest and at sugar.
——— *finitima*—10th June; common at rest; rarely at sugar.
——— *mactata*—31st August to September; common at rest and sugar.
——— *modica*—7th July to September; very common at rest and sugar.
——— *reniformis*—31st July to September; not uncommon at sugar.
Celæna herbimacula—23rd June to October; seemingly a succession of broods; very common at sugar, light and rest.
——— *chalcedonia*—25th June; rare at sugar.
Dipterygia pinastri—14th June; not common at sugar and at rest.
Xylophasia apamiformis—16th June; frequent at sugar and at rest.
——— *sputator*—4th July to September; common at sugar and bred.
——— *dubitans*—12th July; rare; one specimen in spider's web.
——— *lignicolor*—27th June to August; common at sugar and lime blooms.
——— *verbascoides*—9th July; rare; one specimen at sugar.
——— *sectilis*—12th June to August; not uncommon at sugar and rest.
——— *cariosa*—6th July; rare; one specimen at rest.
Cloantha ramosula—18th May; rest hybernated; 1st September, fresh specimen at rest; rare.
——— *vomerina*—8th May; rare at Sallow Palms (*Salix caprea*).
Phlogophora periculosa—6th August; rare at sugar.
——— *iris*—9th June; rare at sugar.
Euplexia lucipara—2nd June to August; not common; at rest and sugar.
Nephelodes violans—1st September; common at light and sugar, but always in bad condition.
Luceria loculata—27th June; not uncommon at sugar.
Hydræcia lorea—16th June to July; common at light, flowers and sugar.
——— *nictitans*—21st July to August; common at sugar; neither so variable nor so beautiful as European specimens.

(To be Continued.)

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TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 249, vol. vi.)

Since the preceding portion of this paper, as well as much of that which follows in this and some following numbers, were placed in the hands of the Editor of the CAN. ENT., I have received from Mr. Belfrage another collection of Tineina from Basque County, Texas, containing additional specimens of species found in the first collection, and several new species. The only species contained in this last collection which has been previously described from more Western localities, and were not contained in the former collection, are *Gelechia solaniella?* Cham. and *Strobisia iridipennella* Clem. and *Theisoa bifasciella.* The specimens of the first named differ somewhat from bred specimens from Kentucky and Missouri, so that I mark them doubtfully as of this species; I however believe them to be the same. *Strobisia venustella* Cham., I am now satisfied, is a synonym for *S. iridipennella* Clem. Because of the presence of several brilliant blue spots on the wings of my specimens, not mentioned in Dr. Clemens' description, I was led to believe that they belonged to a different species. But the individuals vary in this respect. Mr. Stainton, in his edition of the Clemens' papers, has corrected Dr. Clemens' description so far as it differed from specimens in his collection. Dr. Clemens' description was probably correct of the specimens observed by him. The single Texas specimen in this collection has a less number of the blue spots than any other that I have seen. I insert here a few descriptions of species contained in Mr. Belfrage's last collection, which are new, reserving for a future paper other new species and notes on those described in papers already in the hands of the Editor. The second collection was made in Basque County, Texas.

HYPONOMEUTA.

H. 5-punctella. N. sp.

Snowy white. On the forewings are five distinct, circular, black spots, three of them forming a line along the middle of the wing, the other two being in the dorsal half of the wing, one of them opposite the space between the first and second, and the other opposite the space between the second and third spots. The first spot is placed about the basal

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fourth, the second about the middle, and the third about the apical fourth. Hind wings silvery white, tinged with gray. *Al. ex.* ¾ inch. Basque Co.

H. apicipunctella. N. sp.

I fear this specific name may at times prove mis-leading, as the apical black spot is small and may not be observed if the specimen is at all denuded.

Silvery white, the hind wings silvery, tinged with gray. There is a distinct black spot on the middle of the anterior margin of the thorax, one on each side of the tip of the thorax, and another on each side before the tip, and one on the patagia. On the forewings there is a black spot at the base, above but near to the fold, a little further back is one on the dorsal margin; above the fold and nearly opposite the second of these wing spots, are two others, one a little further back and nearer to the fold than the other. Further back on the fold is another, near to which, above the fold and about the middle of the wing, is another circular spot, larger than the others. Behind this spot are four others, forming a trapezoidal figure, and behind these, in the apical part of the wing, is a longitudinal spot or dash; there is also a similar dash on the dorsal margin, just before the ciliae. There are six black spots at the base of the dorsal ciliae, and five narrow black dashes along the base of the costal ciliae, and *there is a black spot at the tip of the ciliae* behind the row at their base. *Al. ex.* 1¼ inch. Basque Co.

GRACILARIA.

I observe that by some error this generic name is in some preceding papers spelled with two l's. *Gracilaria* is the correct form of the word, and the same form is in use for a genus of Marine Algæ. I am not able to state which genus the name was first applied to. I will add here that the name of one of Dr. Clemens' genera *Aspidisca* is pre-occupied among the Infusoria *(Aspidisca, Ehrenberg.)*

G. Belfragella. N. sp.

Antennae purple brown; face and palpi white; the second joint of the maxillary palpi and the third joint of the labial pair tipped beneath with brown. Thorax and wings purple brown. The costal triangle is very pale lemon yellow, and reaches the fold, where it is somewhat trun-

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cate; posteriorly it extends as a rather wide band along the costal margin to the ciliae. Sides of the thorax purple brown. Anterior and middle legs purple brown, with white tarsi; hind legs whitish, except the apical halves of the femora, which are purple brown. *Al. ex.* $\frac{5}{16}$ to $\frac{7}{16}$ inch. Basque Co.

NÆRA, *gen. nov.*

Second joint of the palpi with a projecting tuft, more nearly like that of a *Plutella* than that of any other genus known to me. When the tuft is removed from the second joint, the palpi resemble those of a *Laverna*, for which I at first mistook it, and the deception is the more readily believed because of the tufts of raised scales on the wings. The form and neuration of the hind wings is exactly that of *Cleodora cytisella*, as figured in *Ins. Brit., v. 3*, while the fore wings, though a little narrower than those of *Gelechia rufescens loc. cit.*, have very nearly the same neuration. The antennae are more than half as long as the fore wings, with the basal joint short and hardly larger than the stalk, which tapers from the middle to the tip. The palpi are somewhat recurved, and long enough to reach the vertex, with the terminal joint a little fusiform, with the tip blunt. The head resembles that of a true *Laverna*, but the face is not so full.

N. fusco-cristatella. N. sp.

Head and face white; second joint of the palpi and the tuft more or less externally marked with dark brown, and the third joint with two brown annulations, one narrow and indistinct about the middle, and a wide one before the apex. The face is marked a little with brown about the base of the antennae, which are white, annulate with brown, and the basal basal joint has two distinct brown annulations, one about its base, the other before its apex. The upper surface of the thorax and fore wings is ash gray, sometimes nearly white, and sometimes suffused with ochreous and brown, and when the thorax and base of the wings are not so suffused, then the white passes gradually into the gray or ochreous brown, deepening gradually to the apex. To the naked eye the greater number of individuals appear to have the thorax and basal fourth and the apical third of the fore wings ochreous or reddish brown, while the middle portion of the wings is white or yellowish white. There are on the fore wings four brown spots, the first placed on the base of the costa, with the others following in a line departing a little from the extreme costa;

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opposite the space between the two last of these spots, and beneath the fold, is another small brown spot on the base, near the dorsal margin; there is also one on the apex of the thorax, and sometimes three or four obscure ones on the thorax before it. Beneath the fold, close to, but not touching it, at about half the wing length, is a tuft of raised scales, the anterior portion being brown and the posterior white. Behind the discal cell are two other tufts, opposite to each other, one within the costal margin and the other within the dorsal margin, and behind the space between these tufts are three or four narrow, longitudinal streaks of white and dark gray, and the dorsal margin behind the tuft is whitish. Behind the costal tuft is an oblique white costal streak, passing backwards *towards* a small whitish spot in the dorsal ciliae, and margined decidedly behind by dark brown; behind the margin of this streak the costal margin along the base of the ciliae is reddish ochreous, with three or four small white spots on the base of the ciliae, which are grayish brown. There is also a small brown spot on the costa just before the middle, and one on the disc behind it. *Al. ex.* ⅜ to ½ inch. Waco and Basque Co.

BUTALIS.

B. buristriga. N. sp.

Dark purple brown, with a narrow yellow streak along the middle of the fold, which is sometimes interrupted. *Al. ex.* ½ inch. Season, October.

B. dorsipallidella. N. sp.

Dark purple brown; the base of the primaries and the dorsal margin to the fold, pale ochreous yellow faintly suffused with purplish. *Al. ex.* ½ inch. Season, April.

B. immaculatella. N. sp.

Dark bronzy brown, somewhat iridescent; the second joint of the palpi a little pale beneath. *Al. ex.* ½ inch. Season, April.

The two following species I have been unable to separate from *Butalis* otherwise than by the ornamentation, which is altogether different from that of the other species.

B. plausipenella. N. sp.

Very pale ochreous yellow, nearly white; the second joint of the antennae stained with fuscous towards the apex, and a fuscous annulus

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around the middle of the third joint. Primaries obscurely streaked with pale fuscous between the veins. *Al. ex.* ½ inch.

B. albapenella. N. sp.

White, with a very faint ochreous tinge. *Al. ex.* ⅓ inch. Season July

GLAUCE, *gen. nov.*

The species for which this genus is erected is congeneric with, or, at least, is closely allied to some species of *Gelechia*, and but for the peculiarities of the secondaries, I should have placed it in that indefinite group.

Head and face smooth; scales appressed; face broad, somewhat retreating; antennae more than half as long as the wings, stalk simple, basal joint elongate but not enlarged; tongue moderately long, scaled; no maxillary palpi; labial palpi recurved, divaricating, overarching the vertex; third joint pointed, nearly as long as the second, which is scarcely thickened beneath.

Primaries lanceolate; cell closed, short and narrow; costal vein short; the subcostal sends two veins to the costal margin from behind the middle, one from the end of the cell, and the apical branch, which is trifid, the first branch going to the dorsal margin, the other two to the costal margin; the median subdivides into four branches from the hinder part of the cell; the discal is short, with no branch, and the submedian is furcate at the base.

Secondaries a little narrower than the primaries, with the posterior margin excised beneath the tip; *the costal margin from the base to the middle is armed with a row of stiff, sharp, two-edged bristles, passing gradually towards the middle of the costa into large scales*, and is slightly excised from the middle to the tip. *The cell is closed, short and wide*, the discal vein being placed about the middle of the wing, long and without any distinct branch. The subcostal is straight and furcate before the tip, one branch going to each margin. A branch of the discal vein or a fold is faintly indicated, and is continued through the cell to the base; the median gives off a short branch before its middle, and three from the end of the cell; submedian somewhat distinct, internal obsolete; there is also a faintly indicated vein or fold through the middle of the cell from the base, touching the median between its last two branches.

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G. pectenalaella. N. sp.

The ground color appears to be pale yellowish, but it is almost entirely obscured by dense fuscous dusting and fuscous spots; apex of the primaries more deeply fuscous; head a little iridescent; antennae annulate with sordid yellowish. *Al. ex.* $\frac{7}{16}$ inch. Season, September.

(To be Continued.)

THE MEXICAN HONEY ANT.

(Myrmecocystus Mexicanus.)

BY THE EDITOR.

During the summer of 1873 we received from an esteemed correspondent, Mr. Jacob Krummeck, residing in Santa Fe, New Mexico, several packages of this most curious insect, accompanied by letters giving interesting details of their habits and of the uses to which the

Fig. 1.

honey they secrete is put. In fig. 1 our readers will find excellent figures of a worker, a honey secreter and cocoons, commonly known as eggs, drawn by Miss Peart, of Philadelphia. At the meeting of the American Pharmaceutical Association, held in Baltimore in 1873, we presented a paper on this insect, from which we quote the following:

Very little can be found in Entomological works relating to this insect. Some thirty years ago, a Belgian naturalist, M. Wesmael, received specimens from a party travelling in Mexico, and published some observations on it in the fifth volume of the Bulletin of the Royal Academy of Brussels, giving it the name of *Myrmecocystus Mexicanus.* The discoverer found them very common near the town of Dolores, where they were known under the native name of Busileras. He states that they live in underground nests, which are not distinguishable from without. In early life none of these insects present any unusual distension of the body, but when arrived at a certain period of maturity some individuals begin to

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show a distended abdomen, which after a time becomes swollen into a comparatively immense sphere, produced by the distension of the membrane connecting the abdominal segments, this sphere or sac being filled with a sort of honey. Another class of individuals in the community, raised from the same brood of eggs, manifest no tendency of this sort, but retain the usual normal form of abdomen. Both these classes of ants are neuters. When the sacs of the honey-producers are full they are somewhat like a transparent bubble of a yellowish color. They are unable in consequence of their immense burden to leave their nests, and are necessarily almost inactive, remaining fixed or suspended to the floors of the galleries of their nests elaborating this honey, which, it is said, they subsequently discharge into cells similar to those of the hive. It is also stated that the women and children dig them up and enjoy their honey, and that it is by no means unusual for these insects to be served at table, the head and thorax with the legs being removed, when the distended abdomens are eaten as a delicate sweetmeat. The neuter ant without the distended abdomen is the active worker in the establishment.

Our friend Krummeck informs us that they are found in considerable numbers in the mountains around Santa Fe; that the honey ants are unable to move and are fed by the active workers. He says, "I have sat by their nests and watched them working, for, at one time, six or seven hours; the workers carry leaves of different plants home, to feed, as I suppose, the others that produce the honey." Mr. Krummeck has tried to procure us specimens of the plants on which this insect feeds, but has not yet succeeded. He does not think that the honey is deposited by these honey ants in cells, as has been stated, but that they keep the fluid in their bodies, and the workers feed from them, and that when the honey in the sac of an individual is exhausted, it dies. In reference to the uses made of this honey in New Mexico, he says that the natives make a very pleasant drink of it, which is made in the proportion of three or four drachms of the honey to six ounces of water. It has no commercial value, is not brought to market, but simply made for their own use. They use this drink among themselves in the mountains in cases of fever, where medical attendance cannot be obtained. The honey is also used by them as a cure for eye diseases, especially for cataract.

Being very anxious to see this insect alive, Mr. Krummeck very kindly did his best to gratify us in this particular, having twice sent us boxes of living specimens, but the unavoidable delay and knocking about

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attendant on so long a journey by mail, has in each case resulted in the death of all the ants before they reached their destination, the packages being literally soaked with the honey which had escaped from their bodies.

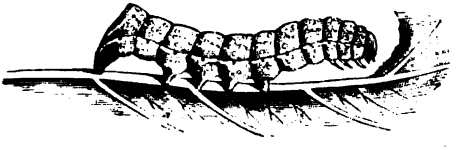
ON SOME OF OUR COMMON INSECTS.

THE GREEN GRAPE-VINE WORM---Amphipyra pyramidoides.

BY THE EDITOR.

The caterpillar of this species, shown in fig. 2, is occasionally very destructive to the grape vine, with us more particularly affecting those

Fig. 2.



grown under glass, although it is not by any means confined to this plant, feeding readily on the plum, pear, thorn, raspberry and poplar. The larva is found early in June, and is full grown usually about the middle of the month. Its length is from one and a quarter to one and a half inches, the body tapering towards the front and thickened behind. The head is rather small, flattened in front, and of a whitish green color, with the jaws or mandibles tipped with black. The body is whitish green, a little darker on the sides, with a white stripe down the back, a little broken between the segments and widening somewhat behind. There is a bright yellow stripe on each side close to the under surface, which is most distinct on the hinder segments, and a second one of the same color, but fainter, half way between this and the dorsal line; this latter is more distinct on the posterior portion of the body, and follows the peculiar prominence on the twelfth segment, as shown in the figure. The under side of the body is pale green.

When full grown, this caterpillar changes to a dark brown chrysalis, either at or a little under the surface of the ground, from which the moth

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appears in the latter part of July. This moth, which is represented in fig. 3, measures, when its wings are expanded, about one and three quarter

Fig. 3.

inches; the fore wings are dark brown, shaded with paler brown, and with dots and wavy lines of dull white. The hind wings are reddish with almost a coppery lustre, becoming brown on the outer angle of the front edge of the wing, and paler towards the hinder and inner angle. The under surface of the wings is much lighter in color than the upper; the body is dark brown, with the hinder portion banded with lines of a paler hue.

CORRESPONDENCE.

DEAR SIR,—

Mr. A. R. Grote has published a paper in the "Bulletin of the Buffalo Society of Natural Sciences," in which some statements are made which call for correction on my part. I shall not allude to his personal remarks, similar in character to those which he has made concerning others who have ventured to criticize his scientific work or to correct his mistakes; but to the palpable blunders into which he has fallen with respect to some species recently described by me in the Proceedings of the Boston Society of Natural History. The following is a list of those of my species which were corrected (sic) by Mr. Grote: *Hadena rasilis*, *H. vulgivaga*, *Glaea sericea*, *Agrotis exertistigma*, *Xanthoptera nigrocaput*, *Copipanolis vernalis* and *Mamestra illabefacta*.

Mr. Grote states that my *H. rasilis* is a re-description of *Elaphria grata* Hübn., referred by him in the List to Caradrina! If Mr. Grote will examine Hübner's figure, he will see that it represents a much larger, stouter, and entirely different insect. Mr. Grote has apparently overlooked

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the fact that it is an excellent representation of the common species determined as *Taeniocampa oviduca* in collections; this, therefore, shonld be considered a synonym of *grata*, and *rasilis* remain a distinct species of *Hadena*.

My comparisons were made with two copies of the "Zutrarge;" a fine one in the library of Mr. S. H. Scudder, and another more coarsely colored in that of Harvard University.

Mr. Grote remarks that my *Hadena vulgivaga* is probably a re-description of *H. apamiformis* Guen. I am perfectly well acquainted with Guenee's species, and *vulgivaga* has not the slightest resemblance to it; it is, as I mention in the description, a new species allied to *H. rurea*.

Mr. Grote states that my *Glaea sericea* seems to be founded on a specimen sent him for determination, and which he considered identical with his *Orthosia ! apiata*. I never sent a specimen of *Glaea sericea* to Mr. Grote, and the species is entirely distinct from *apiata*. I did send Mr. Grote a variety of *apiata* for comparison with his type, and this he has probably confounded with *sericea*.

Mr. Grote remarks that my *Agrotis exertistigma* is probably only a Californian variety of *alternata*. After re-examining my material, consisting of two specimens of the former species and about twenty of the latter from Nebraska to Canada, I do not see any reason to change my opinion, but I should be happy to do so if Mr. Grote can prove the species identical.

Mr. Grote refers my *Xanthoptera nigrocaput* as a synonymn of *X. Ridingsii* Riley. The fact is that the author's copies of the first signature of Mr. Riley's paper, containing the name and a few lines of the description of his new *Xanthoptera*, were distributed some time before my paper appeared (I did not receive a copy, however, until January, 1875). The second signature, containing the larger part of the description, has not yet appeared, to my knowledge (Jan. 25th, 1875.)

Mr. Grote's attention having been called by me to his erroneous arrangement of the species of *Xanthoptera*, he at once improves the opportunity to found a new genus, *Exyra*. It is obvious that this genus (even if a needful one) can not stand, as it is not accompanied by a word of generic diagnosis.

In a similar manner he founds a new genus for my *semiapata*, after having only a month before (see Proc. Ac. Nat. Sci., Phil., 7, 206, 1874) entirely mistaken its generic characters and placed it in *Apamea*.

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Mr. Grote states that my *Copipanolis vernalis* is a re-description of his *Eutolype Rolandi*. The fact is, Mr. Grote has priority by one day (his paper was read Nov. 3rd, and mine Nov. 4th.) In the same papers were published *Apamea purpuripennis* Grote and *Orthosia baliola* Morr.; these species are synonyms and Mr. Grote's name has priority.

Lastly, Mr. Grote states that I have re-described Dr. Harvey's *Mamestra lilacina*. On the appearance of Dr. Harvey's description, I gave Mr. Grote a typical specimen of my species, and requested him to compare with the type of Dr. Harvey's species, and give his opinion. In his letter (which I should be glad to show to any one interested) he states unequivocally that the species are distinct, and on his word I published my description of *illabefacta*.

In this letter I have only referred to those mistakes of Mr. Grote's which, if allowed to remain unanswered, would create a wrong impression in regard to my work. I make no attack upon him or upon his work, although, if I were desirous of doing so, material would not be lacking.

The identification of specimens of the common *Agrotis messoria* Harris (already once re-described by Messrs Grote & Robinson as *A. repentis*) with *A. lycarum* Evers., a Siberian species, is an instance in point. I am yours respectfully,

H. K. Morrison, Cambridge, Mass.

GLAUCOPSYCHE COUPERI Grote.

Dear Sir,—

As this butterfly has lately been figured as *Pembina* Edwards, the following remarks will settle the distinction between the two species:

"With regard to the *Lycaena* from Anticosti, I presume Mr. Scudder is correct. The original *Pembina* came from Lake Winnipeg, a single specimen or a single pair, several years ago. These types were afterwards lost in a box of insects sent by me to California. I had forgotten them, and some how, another species had been assumed to be *Pembina* by Scudder and others, and I had fallen into the error myself of thinking with them that *Pembina* was allied to *Lygdamus*. I discovered the fact last year, and called Mr. Scudder's attention to it. I think this *Couperi* was what had been thought to be *Pembina*, and Grote was correct in naming it *Couperi*."

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Mr. Scudder writes October 10th, 1874, as follows:

"I formerly believed this to be *Pembina*, having received it from Edwards with that determination. I therefore named some of your first lot (as Mr. Mead says) *Pembina*. Afterwards I received a lot from your subsequent journeys, sent me by Grote. The specimens were poor and much rubbed, and I thought when I determined them to be distinct from the so-called *Pembina*, that ♂ and ♀ alike had a broad marginal band. Mr. Edwards was the first to discover his own error, and drew my attention to it. We do not know *Pembina;* it is temporarily lost to science, but it will turn up one of these days. From Edwards' description and the context, it is plain that your butterflies are *not Pembina*. After *Couperi* was described, I saw many other and fresher specimens, and then discovered my mistake (accepted and published by Grote) about the distinction between your two lots of butterflies, and found that although Grote was in error in describing *Couperi* as distinct from the so-called *Pembina*, the *name* must stand because the first one, apart from *Pembina*, was given to an insect which was not *Pembina*.

"There are but two known species of *Glaucopsyche* in America:

"1. *Lygdamus* of the South.

"2. *Couperi* of the North, long supposed to be *Pembina* Edw., which however belongs to a distinct group."

PAPILIO BREVICAUDA, Saunders.

I have received specimens of this butterfly from Percé, district of Gaspé, the north shore of the Gulf of St. Lawrence.

WM. COUPER, 67, Bonaventure Street, Montreal.

COLIAS PHILODICE.

DEAR SIR,—

Mr. W. H. Edwards informs me that Mr. Mead has determined by experiment that this species becomes crimson on the contact of the wings with cyanide in the collecting bottle. This accounts for a supposed variety of *philodice* sent me by an Entomological correspondent in good faith as having been collected by her. The lady reported that she had not particularly noticed the specimen at the time of capture, but on setting

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her specimens she found that one of them had crimson patches on the wings. I have not seen any mention of the fact before in print, and as the illusion is very complete, owing to the brilliancy and thoroughness of the color, its true origin should be brought to notice, that others may not be deceived thereby. A. R. GROTE, Buffalo, N. Y.

DEAR SIR,—

On page 117, of vol. vi of your journal, Mr. Grote kindly furnishes us with a list of all the species of Noctuidæ common to this country and Europe, known to him. The following may, very safely, be added :

Ichthyura inclusa—Prob. *I. inversa* Packard.
Calocampa vetusta—New York, New Jersey, &c.
Graphiphora plecta Ochsen., N. Y., N. J.
Agrotis ypsilon = *A. suffusa; ypsilon* has priority.
Hadena chenopodii—New York, Michigan, New Jersey.
Calligenia miniata—New York.
Plusia urticæ—Penn.
Eugonia magnaria—Either *E. autumnalis* or *E. alniaria*, I forget which.

The last three I have received from Russia.

It may also interest your readers to know that *Danais archippus* is found in Queensland, without any variation that I can see. There is, too, a very suspicious resemblance between some of the Labrador species and those of Europe—for instance, between *C. phicomenes* and *C. nastes;* also between *C. pelidne* and our *C. philodice.* However, these require further investigation.

W. V. ANDREWS, New York.

DEAR SIR,—

A note on p. 92, vol. vi, CAN. ENT., states that Mr. Grote, of Soc-Nat. Sci., Buffalo, received specimens of Coliadae taken by me in 1873, on Anticosti. I wish this error corrected, as that gentleman had no *Colias* from the collection made that year on the island.

WM. COUPER, 67 Bonaventure St., Montreal, P. Q.

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BOOK NOTICES.

The Distribution of Insects in New Hampshire, by Samuel H. Scudder—a chapter from the first volume of the final report upon the Geology of New Hampshire, pp. 53, with two plates and several wood-cuts.

The species of the Lepidopterous genus Pamphila, by Samuel H. Scudder, pp. 12, with one colored plate and one uncolored, from the Memoirs of the Boston Society of Natural History,

We have been favored by the author with copies of both the above papers, for which we tender him our sincere thanks. The first is a valuable contribution to the Entomology of New Hampshire, treating more particularly of the Butterflies and Gryllides. The second, besides valuable notes on the species enumerated, contains convenient tables, by the use of which the males and females of the various species may be readily determined. The colored plate, containing two figures, is a chromo-lithograph, nine stones having been used in producing the tints. The execution of this plate is excellent; the artists are Messrs. Sinclair & Son, of Philadelphia. The second plate illustrates the abdominal appendages of the males of eight species.

Entomological Contributions, No. 3, by J. A. Lintner, Albany, N. Y., with two photograph plates illustrating 12 species of Cucullia. We have already noticed this work in vol. 6, p. 120; the addition of the two excellent plates in the present copy adds much to its value.

BOOKS RECEIVED.

Note sur l'oeuf et le Jeune age de la Chenille D'Œneis aello, par Samuel H. Scudder, 8vo., pp. 4, with one plate.
Supplement to the List of North American Noctuidæ, by A. R. Grote, from Bul. Buf. Soc. Nat. Sci. pp. 15.
Proceedings of the Academy of Natural Sciences, Philadelphia, part 2. April—September, 1874, with three plates.
On the Habits of Some American Species of Birds, by Thos. G. Gentry, from the Proc. Acad. Nat. Sci., Philadelphia, 8vo., 14 p.
Proceedings of the Boston Society of Natural History, vol. xvii, part 1, May—October, 1874. pp. 128.
First Annual Report of the Ross County Horticultural Society, Chillicothe, Ohio.
Third Annual Report of the State Pomological Society of Michigan.
Monthly Report of the Department of Agriculture, Nov and Dec. 1874.
Bulletin Buff. Soc. Nat. Sci., vol. 2, No. 3, September, 1874.
Nature to Jan'y 14, 1875.
Science Gossip to Jan'y, 1875.
The Zoologist to Jan'y, 1875.
Newman's Entomologist to Jan'y, 1875.
The Scottish Naturalist, Jan'y, 1875.
Journal of the Agricultural and Arts Association, November, 1874.
Journal of Education to Dec., 1874.
The Canada Farmer, Toronto, to Jan'y, 1875.
Psyche, The Indiana Farmer, The Prairie Farmer and Le Naturaliste Canadien.

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The Canadian Entomologist.

VOL. VII. LONDON, ONT., FEBRUARY, 1875. No. 2

CAPTURES OF NOCTUIDÆ AT ST. CATHARINES, ONT.

BY GEO. NORMAN, ST. CATHARINES, ONT.

(Concluded from Page 6.)

Hydrœcia sera—2nd July; very common; at sugar and light.
Gortyna cataphracta—September 22nd; bred in quantities from larvæ in the stems of *Arctium lappa;* also at rest.
Scolecocampa ligni—1st July; rare; at light.
Leucania Henrici—15th April; bred.
———*pallens*—2nd July; not common; lime blooms.
———*phragmitidicola*—7th June; not uncommon; at light and sugar.
———*commoides*—2nd July to August; common; at lime blooms, sugar and light.
———*unipuncta*—2nd June; very common; at sugar and light.
———*pseudargyria*—11th July; rare; at sugar.
Ufeus satyricus—20th July; rare; at sugar.
Caradrina miranda—2nd June; not uncommon; at light.
Amphipyra pyramidoides—24th July to August; common; at sugar.
———*tragopoginis*—13th July; not uncommon; at sugar.
Ceramica picta—7th June; bred; larvae afterwards on cabbages.
Matuta Catharina—*N. g. et sp.*—Dec. 29th, 1873, wing in spider's web 11th May, rare; at sallow palms.
Perigrapha Normani. N. sp.—11th May; rare; at sallow palms; June, one at sugar.
Tæniosea gentilis. N. g. et sp.—30th June; very common; at lime blooms, sugar and rest to August.
———*perbellis. N. sp.*—2nd July; rare; at rest.
Tæniocampa alia—2nd May to June; very common; at palms.
———*oviduca*—30th May; not unfrequent; at light.
Orthodes infirma—29th June; not unfrequent; at sugar and light.
———*cynica*—8th June; rare; at sugar.

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Cirrhædia pampina—1st September; common all the month; at sugar.
Cerastis decliva—21st September to October; common; at sugar.
——— *inulta*—18th September; rare; at sugar.
Orthosia infumata. N. sp.—18th August; not uncommon; at rest and sugar.
Xanthia ferruginoides—15th September to October; very common; sugar and with net.
——— *euroa*—9th September; not rare; at rest.
Scopelosoma Morrisoni—4th May; hybernated; common on palms; 18th October, fresh brood; rare; at rest.
———*devia, n. sp.*—10th May; rare; at sallows.
Gonoptera libatrix—4th May; hybernated; at rest. Fresh brood—June to October; not unfrequent; at sugar.
Xylina petulca—5th May; hybernated; at palms. Fresh specimens—11th September; common; at rest and sugar.
——— *ferrealis*—5th May; hybernated; at palms. Fresh brood—19th September; rare; at rest.
——— *Bethunei*—2nd May; hybernated; at palms. Fresh brood—7th September to October; common; at rest and sugar.
——— *disposita*—5th May; hybernated; at palms. Fresh brood—September to October; not uncommon; at rest and sugar.
——— *cinerea*—16th September; at rest and sugar; not rare.
——— *laticinerea*—2nd May; hybernated and very common; at palms and sugar. Fresh brood—seems later than the preceding species; 8th October; very numerous; at sugar and rest. I never took *cinerea* in the spring.
——— *tepida*—8th October; rare; at rest.
——— *pexata*—3rd May; hybernated; at palms. Fresh brood—16th September to October; frequent; at rest and sugar.
Calocampa nupera—10th May; hybernated; single specimen; at light.
Cucullia asteroides—7th June; common; at flowers and rest.
Crambodes talidiformis—13th June; rare; with net at raspberry blooms.
Adisophanes miscellus—2nd May; rare; at rest.
Plusiodonta compressipalpis—24th June; rare; with net over *Philadelphus coronarius*.

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Placodes cinereola—19th June; not uncommon; at light.
Abrostola ovalis—16th August; rare; at light. Many larvæ of some *Abrostola* afterwards beaten from nettles.
Plusia aerea—20th June; rare; at light.
———*balluca*—June; rare; at light.
———*precationis*—3rd Juue to October; very common; at flowers and at rest.
———*simplex*—1st June; rare; with net over Lilac blooms.
———*mortuorum*—2nd August; rather scarce; at rest and over Thistle flowers *(Cnicus arvensis.)*
———*8-scripta*—1st September; rare; at rest.
———*ampla*—21st July; rare; with net over *Cnicus arvensis.*
Heliothis exprimens—5th June; rather frequent; over Lilac and *Weigelia rosea.*
Acontia candefacta—6th September; rare at light.
Oligia versicolor. N. g. et n. sp.—Rare; 23rd June; at rest.
Leptosia concinnimacula—1st June; common; at rest and at sugar.
Erastria carneola—1st June to September; very common; at rest and at sugar.
——— *synochitis*—25th June; rare; at rest.
——— *nigritula*—15th June; common at rest to July.
——— *muscosula*—9th June; very common; at rest and at sugar.
Chamyris cerinthia—29th June; rare; one pair at rest.
Drasteria erichtea—May 10th; common; at light and sugar to August.
———*erichto*—12th June; common; at rest, sugar and light.
Parallelia bistriaria—8th June; common; at rest and at sugar.
Parthenos nubilis—3rd June to September; very common; at rest and at sugar.
Catocala epione—27th July; rare; at sugar.
———*insolabilis*—29th June; rare; at rest.
———*residua*—1st August; not common; at sugar.
———*relicta*—4th August; common to September; at sugar and rest.
———*unijuga*—18th August; not rare; at sugar.
——*Briseis*—5th August to September; not uncommon; at sugar and at rest.
——*parta*—20th July to September; common; at rest and sugar.
——*ultronia*—11th July to August; very common; at rest and sugar.
——*concumbens*—4th August to September; very common; at rest and sugar.

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Catocala amatrix—27th August to September; common; at rest and at sugar.
———— *cara*—20th August to September; less common than last; at sugar and at rest.
———— *innubens*—2nd August; very common; at rest and at sugar.
———— *D. C.* var. *scintillans*—8th September; rare; at sugar.
———— *ecrogama*—21st July to September; very common; at rest and at sugar.
———— *neogama*—24th July to August; common; at sugar and at rest.
———— *piatrix*—15th August; not rare; at sugar.
———— *habilis*—20th August not uncommon; at sugar.
———— *cœlebs. N. sp*—18th August; rare; one specimen at sugar; Strathsallow.
———— *Clintoni*—11th July; rare; one specimen at sugar.
———— *polygama*—8th July to August; very common; at sugar and at rest.
Homoptera lunata—2nd May to June; common; at rest and at sugar.
———— *Saundersii*—17th June; common; at rest and at sugar.
———— *edusa*—11th August to September; not uncommon; at sugar and at rest.
Ypsia undularis—23rd May to June; common; at sugar and at rest. Apparently a second brood in August.
Pseudaglossa lubricalis—10th July; common; at sugar and at lime blooms.
Epizeuxis Americalis—9th July; common; at sugar.
Chytolita morbidalis—23rd June; common; at sugar.
Palthis angulalis—24th June; rare; at sugar.
Bomolocha baltimoralis—21st June; very common; at rest and at sugar.
———— *abalienalis*—14th June; common; at rest and at sugar.
Hypena subrufalis—29th June; not common, at rest.
Platyhypena scabra—23rd July to October; common; at rest.

THE *Cossus* of the Greeks and Romans, which, at the time of the greatest luxury among the latter, was introduced at the tables of the rich, was the larva, or grub, of a large beetle that lives in the stems of trees, particularly the oak; and was, most probably, the larva of the Stag beetle, *Lucanus cervus.*—*Curious History of Insects.*

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PRELIMINARY LIST OF THE NOCTUIDÆ OF CALIFORNIA.

Part III.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

21. Mamestra cinnabarina Grote *(ante.)*

Under the number 5574, Mr. Hy. Edwards sends six specimens which, in their yellow rufous color, resemble the European *M. fasciuncula;* they are distinguished by the paler hind wings, the white reniform and the absence of white outer shading to the t. p. line. The Californian species may be held to represent the European *M. strigilis.*

50. Zosteropoda hirtipes Grote *(ante.)*

Under the number 4408, Mr. Hy. Edwards sends the female of this interesting form. The hind wings are fuscous in the disc with a shaded fascia; they are without the gathering of longer hair on the veins, which characterize the male. The tibiæ are clothed with sparse and rather long hair, not tufted as in the male. The long pointed palpi are characteristic and the shape of the primaries and ornamentation are as in the male. By a clerical error I have given the eyes as "naked" in my original generic description. They are hairy, as in *Heliophila,* and this character, with the tufted legs, induced my approximation of the genera in the "List of the Noctuidæ of North America."

51. Agrotis euroides Grote, Proc. Acad. N. S., Phil., 1874, 202.

California, Mr. Behrens, No. 66; Vancouver, Mr. Hy. Edwards, No. 5576.

52. Agrotis gravis Grote, Bull. B. S. N. S., 2, 155.

Mendocino, Mr. Behrens, Nos. 83, 132; California, Mr. Hy. Edwards, No. 2622.

This species varies in tone. In two ♀ specimens the fore wings are yellow brown, with the stigmata concolorous. A ♂ specimen sent by Mr. Hy. Edwards from Vancouver, No. 5607, may belong here; the markings are obliterate and the primaries more rounded.

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53. Agrotis lagena Grote.

♂. The specimen is much larger than *A. Hollemani*, hind wings paler and the ornamentation differs in detail, with a general great similarity. The resemblance to the Coloradian *Oncocnemis Chandleri* is so perfect that they can hardly be separated. Nevertheless, the *Oncocnemis* has unarmed tibiae, the fore tibiae alone with a terminal spine, whereas the *Agrotis* has all the tibiae armed, the fore tibiae with a double row of spines. The insect is also more whitish and larger. The antennae are simple, the eyes naked and lashed. Whitish gray, with longitudinal interspaceal striations of a darker tint, more prominent terminally. The stigmata are united, the decumbent open orbicular fusing with the reniform, so that a flask-shaped figure is produced longitudinally on the cell. A narrow black basal ray; a terminal series of blackish dots; the nervules accentuated. Hind wings whitish, soiled with fuscous; the nervures marked. Body pale, with a black line on the collar and inner edging to the tegulae. Palpi with the middle joint dark at the sides. Beneath whitish, without markings. Exp. 40 m. m. California, Mr. Hy. Edwards, No. 2256.

54. Agrotis clandestina (Harr.) Grote.

Two specimens from Nevada, under the number 5627, from Mr. Hy. Edwards. One specimen collected by the late Mr. Crotch, Mus. C. Z. Camb., from California.

55. Agrotis alternata Grote, List, p. 10.

Agrotis exsertistigma Morr., Proc. Bost. Soc. N. Hist. 1874, 166.

Mendocino, No. 4 (red label), Mr. Behrens; also sent under the No. 164.

The Californian specimens do not seem to me to belong to a different species. The character of the open orbicular is variable, as in one specimen it is shaped as in my Eastern specimens. The collar is brown in all my remaining Californian specimens. I forwarded Californian examples of this species to Mr. Morrison with this determination, although this circumstance is not mentioned (as should have been done) in Mr. Morrison's paper. This is a very variable species; one Californian specimen has the forewings unicolorous pale brown, without markings. Others have no trace of the claviform, and the median space is not shaded with black, showing that Mr. Morrison's characters for his species are invalid.

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56. Agrotis cupida Grote.

A single specimen, without number, sent by Mr. Behrens, belongs apparently to this species.

57. Agrotis subgothica (Haw).
Agrotis jaculifera Guen.

Two fresh specimens sent by Mr. Hy. Edwards under the number 4656, from Vancouver Island. The colors are more intense, else I see no differences from our Eastern material.

22. Mamestra illaudibilis Grote.
Mamestra laudabilis Grote, Ante p. 157.

Both sexes are sent by Mr. Hy. Edwards, from Vancouver Island of this species, which agrees in size with the Eastern *laudabilis*, and in the lunulations of the median lines. The Western species differs by the tegulae being lined with black, by the median space being wholly black, by the sub-basal and sub-terminal spaces being greenish white, and apparently by the smaller reniform. The bright green tint of *laudabilis* is wanting. The white hind wings have the median nervules soiled with fuscous, and the ♀ has a blackish clouding in the disc. The abdomen is whitish, over fuscous. California; Vancouver Island, Nos. 5580 and 5581, Mr. Hy. Edwards.

58. Mamestra oliracea Morr., Proc. Bost. Soc. N. Hist., 1874, 143.

To this species I would refer a specimen from Colorado, sent by Mr. Theo. L. Mead, under the No. 41, one from Canada sent by Mr. Saunders, and two from Vancouver Island sent by Mr. Hy. Edwards, under the No. 5580. It is distinguishable from *M. 4-lineata*, *M. laudabilis* and *M. illaudabilis* by the fuscous hind wings, and from the two latter by the greater evenness of the median lines. It is a little larger than any of the other species and bears a certain resemblance to *Hadena modica*. Besides these, five specimens from Vancouver Island seem merely to differ by being a little smaller and more blackish, the fore wings a little shorter, the white subterminal line sometimes showing a ruddy and pale blotch before it, near the internal margin, and in one specimen the t. p. line tinted with reddish. They agree in the fuscous secondaries and in the comparative evenness of the median lines, while the median space varies a little in width. These latter specimens bear the number 5579.

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39. Hadena divesta Grote, ante, 215.

Three fresh specimens from Vancouver Island, with the fore wings a little more brown than the Californian type. This handsome species may be recognized by the outward position of the t. p. line and its general straightness. It is allied to *atlantica*, *subjuncta*, etc., but is far prettier and has possibly a nearer European ally.

Vancouver Island, No. 5573, Mr. Hy. Edwards.

59. Hadena indirecta Grote.

This species resembles *H. divesta*, but the t. p. line is exserted on the median nervules, below which it runs inwardly, constricting the median space greatly inferiorly. The fore wings are more purely brown; the median space blackish. The W-shaped mark of the subterminal line obsolete, not distinct as in *divesta*. The orbicular is oblique and narrow, not rounded and full as in its ally. The hind wings are fuscous, with the line not as distinct as in *divesta*. There is a dark mark on the subterminal fold of primaries before the subterminal line, and the fold on the median space is also marked. The median lines are geminate, the veins beyond the t. p. line dark marked. There appears to be a dark basal mark continued along vein 1. *Expanse* 36 m. m. Two specimens, the male with simple antennae, in not the best condition, sent by Mr. Hy. Edwards from Vancouver Island, under the number 5588.

60. Actinotia Stewarti Grote.

The eyes are naked and the species is congeneric with the Eastern *ramosula*. The basal ray is broader. The pale reniform is closed with a V-shaped outward notch, and situated nearer to the t. p. line, which latter is visible as a continuous dark shade, angulate on the veins, from opposite the cell to internal margin, The orbicular is oblique, not longitudinal pale centered, black ringed, small. The wing is shaded with brown below the basal dash, and also below vein 2. The inferior zigzag portion of the t. a. line is visible. Hind wings darker than in *ramosula*, wholly fuscous. *Expanse* 30 m. m.

California, Mr. Hy. Edwards, No. 4567; named for my assistant, Mr. W. W. Stewart.

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ON SOME OF OUR COMMON INSECTS.

THE CYLINDRICAL ORTHOSOMA—Orthosoma cylindricum, Fabr.

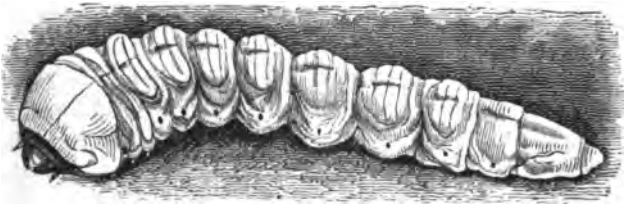
BY THE EDITOR.

This formidable looking, long-horned beetle, fig. 4, is very common in most portions of Ontario during the month of July. It flies at night with a rapid and noisy flight, entering the open windows of lighted rooms during the evenings, often to the great alarm of nervous inmates. This beetle measures an inch and a quarter, or even more in length, and is about one-third of an inch in width. Its body is long and narrow and of a light brown color, which assumes a darker shade on the head and antennae. The thorax is furnished with three sharp teeth on each side, and each wing case has three slightly raised ribs or lines.

Fig. 4.

The larva of this insect inhabits decaying pine wood, especially pine stumps, and is supposeed to be several years in completing its growth; it closely resembles the larva of its near relative, *Prionus laticollis*, shown in fig. 5 (after Riley.) This latter, however, differs somewhat in its habits and appetite,

Fig. 5.



seeming to prefer boring into and feeding on living roots, such as those of the Lombardy Poplar, Balm of Gilead, Apple, Pear, and especially roots of the Grape-vine, in the latter case frequently causing the sudden death of the vines attacked.

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TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 12).

LAVERNA.

I have only examined the neuration of one of the species which I here place in this genus, but they are all evidently congeneric, and the neuration of *L. lyonetiella* while not that of *L. cephalonthiella*, nor of either of the three species figured in *Ins. Brit., v. 3.*, does not differ therefrom more than they differ from each other. The limits of the genus are perhaps not so clearly defined as might be wished in respect to the neuration and the raised tufts on the primaries, but as the genus is at present recognized, the proper location of these species is in it. The neuration of *L. cephalonthiella* is almost identical with that of *L. Staintoni*, the chief difference being that the cell of the hind wings is closed and the superior branch of the fork of the apical vein goes to the costal instead of the dorsal margin. The neuration of the primaries is identical with that of *Staintoni*, except that the submedian is furcate at both ends. In *L. lyonetiella* the neuration of the primaries is exactly that of *Staintoni*, but the secondaries are narrower, the costal vein is very long, attaining the margin beyond the end of the cell, which is closed; the subcostal is obsolete from the base to the end of the cell, beyond which it is distinct and furcate, one branch going to the apex and the other to the dorsal margin; the median divides into three equidistant branches; the submedian and internal veins are distinct, thus resembling the neuration of Chauliodus perhaps as nearly as that of Laverna. It is, however, I think nearer that of *L. longiella.*

L. œnotheræella. N. sp.

Second joint of the palpi silvery white, with a dark brown spot beneath near the tip; third joint silvery white, with the apex and a spot beneath at the base brown. Antennae pale yellowish: face, vertex, thorax and forewings silvery white, except as follows: there is a spot at the middle of the anterior margin of the thorax, one also at its tip, and four small ones forming a transverse row across the middle, all of which are shining dark brown; there is also a similar spot at the base of the hind margin of the forewings, which to the naked eye appears to be on the margin of the thorax before the tip; and there is another just within the dorsal margin

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of the wing, just before the middle, and a small costal one a little further back. There is an irregular golden spot, sprinkled with brownish and containing a small tuft of raised scales, on the dorsal margin just before the ciliae, which sends backwards two narrow, oblique, golden streaks, one of which passes to the dorsal margin, and the other, which has some brown scales intermixed, passes back towards the middle of the apical part of the wing, where it becomes confluent with a median, short, straight golden or orange streak, and with a rather long, curved, oblique and narrow costal streak, which begins just before the ciliae and is of the same hue with the other streaks, except near the costa, where it is brown. These three streaks proceed no further after their union, stopping short of the apex; but behind them, in the middle of the apical part of the wing and extending along through the apex and apical ciliae, is another large dark brown streak; and on the costal margin are two large, oblique, reddish golden streaks, the first of which touches the three confluent streaks above mentioned and the dark brown streak in the apex; the second one appears to be faintly divided on the costa by a small white streak, and is narrowly margined behind by dark brown scales; and behind it is a triangular white spot in the ciliae. Beyond this white spot in the ciliae are two narrow, dark brown, oblique lines, diverging from a common point and reminding one of the 'hook' in some species of Gracilaria, and the similar appearance in Polyhymno, to which, in the ornamentation of the apical parts of the wings, this species bears considerable resemblance, as it also does to some species of Lyonetia in so far as the arrangement of these marks is concerned. The apical black streak is bordered behind by a short perpendicular streak of the same hue. Dorsal ciliae white, dusted with dark brown. First two pair of legs dark brown; the tarsi of the posterior pair are annulate with yellow, the legs otherwise silvery white, marked with black spots. Abdomen pale stramineous; secondaries pale yellowish fuscous; under side of primaries fuscous. *Al. ex.* nearly half an inch.

I have also received specimens of it from Miss Murtfeldt, of St. Louis, who bred it from a larva mining in the stalk of the so-called Primrose (*Œnothera Missouriensis*), and who sends me the following notes:

"The larva of this exquisite little moth may be found during the months of August and September boring the stems of *Œnothera Missouriensis*. It feeds upon the pith, leaving the tunnel in its wake filled with coarse powdery granules, and it does not seem to check the growth of the plant to any great extent.

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"The larva is cylindrical in form, with the full complement of very short legs. When mature it measures from 0.45 to 0.50 inch in length, with a diameter of 0.08. Color, pale yellow immaculate, except for the transversely oblong brown spot on the first segment, which represents the cervical shield. The incisions are deep and abrupt, and under the lens the surface appears covered with shallow punctures or stippling. On the dorsum of each segment are two transverse ridges of minute warty elevations, each giving rise to a fine light hair. Head small, oblique, polished, dark, mottled with brown ; jaws a few shades paler.

"These larvae remain dormant in the stems over winter and until spring is quite advanced. They then cut holes through the sides of the stem to, but not through, the thin outer bark or cuticle, showing on the latter like a round transparent spot. The place of egress thus provided, the larvae return to the central burrow and enclose themselves in thick, tough cocoons of white silk in the midst of a loose web of the same material The pupa is rather thick and of a pinkish color, and the wing cases cover only the upper half of the abdomen. This state lasts from 20 to 25 days, the imagines appearing about the last of May."

I have before stated that Miss Murtfeldt has sent me *Gelechia superbella* from St. Louis. St. Louis is on the same parallel that we are on at Covington, but southern insects seem to extend further north along the shores of the Mississippi than along the Ohio. This seems to be especially true as to Southern Illinois. Neither of the two species *(œnotherœdla* and *superbella)* are found in Northern Kentucky.

L. unicristatella. N. sp.

Palpi slender, white, with a narrow, obscure brownish annulation about the middle of the third joint and another near the apex. Head and antennae white. Base of the wings white, except on the costa, the white extending along the dorsal margin to a tuft of raised scales about the middle, but interrupted about the basal fourth by a projection to the dorsal margin of the ochreous and fuscous scales which cover the costal portion of the wing, extending to the fold. The scales of the tuft are white, tipped with dark brown, and immediately before it the white of the dorsal margin projects across the fold into the ochreous and fuscous portion of the wing. In the ochreous and fuscous portion those colors are intermixed with each other and with some white scales, and they spread over the apical part of the wing, where the white is increased in

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quantity so as to form an indistinct, pale, irregular fascia at the beginning of the ciliae; at the apex the ochreous brown again prevails over the white. At the base of the costa the ochreous fuscous is very narrow. Posterior wings purplish fuscous; under surface and legs whitish, the legs marked with brownish on their anterior surfaces. *Al. ex.* $\frac{7}{16}$ inch.

L. rufocristatella. N. sp.

White; antennæ annulate with brown. There is a small reddish ochreous tuft on the disc before the middle of the primaries, behind which the wing is suffused with reddish ochreous; a larger tuft nearly opposite to the first one, and nearer to the dorsal margin, of the same hue with the first one, and another just within the dorsal margin opposite the beginning of the ciliae. Between this last tuft and the costa, and thence to the apex, the wing is suffused with reddish ochreous, sparingly dusted with fuscous. *Al. ex.* $\frac{7}{16}$ inch. Season, July.

L. ignotilisella. N. sp.

No raised tufts on the wings. Silvery white, the costal margin about the middle dusted with pale purple and ochreous scales: an irregular streak or sinus of spots, which are connected by ochreous brown dusting, begins before the middle of the disc, and extends backwards, spreading over the apical part of the wing. *Al. ex.* $\frac{5}{16}$ inch. Season, September.

L. albocapitella. N. sp.

Head, thorax and base of the dorsal margin of the wings pure snowy white; antennæ purplish fuscous, iridescent; palpi white, stained externally with pale purplish fuscous; the white patch at the base of the dorsal margin of the primaries is posteriorly narrowly margined with dark brown, containing a small raised tuft on the margin. The remainder of the primaries are of an indescribable hue, composed of grayish brown ochreous and white scales intermixed, the former hue predominating, or rather, it is brown streaked with ochreous and sprinkled with white; there are three small tufts of dark brown raised scales, each anteriorly margined with white, the white followed by a margin of dark brown; two of them are on the disc before the middle, the other further back and nearer the dorsal margin, and behind it is a fourth tuft also near the dorsal margin; there is a short dark brown streak in the apical part of the wing, within the dorsal margin, and a small dark brown spot about the end of the disc. *Al. ex.* $\frac{7}{16}$ inch. Season, September.

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L. parvicristatella. N. sp.

White, suffused with purplish brown; the second joint of the palpi suffused with purplish brown, and a brown annulus about the middle; antennae annulate with pale brown; primaries suffused with purplish brown, with an oblique brown streak beginning on the costa near the base, and extending nearly across the wing; another about the middle, crossing the wing, and a third less oblique and shorter about the beginning of the costal ciliae, and produced backwards along the middle of the apical part of the wing, interrupting an indistinct, angulated white fascia; these streaks are not continuous, but are rather composed of small purplish brown spots of slightly raised? scales, with a more distinct raised tuft near the dorsal margin in each of the first two streaks, and between the small spots the wing is more deeply suffused than elsewhere. Dorsal ciliae silvery, those of the apex suffused with purplish; there is a narrow streak of dark brown scales along the middle of the apex. *Al. ex.* $\frac{1}{3}$ inch.

L. miscecalonella. N. sp.

White, suffused with ochreous yellow, with a raised tuft of the same hue in the middle of the disc on the primaries; basal third of the primaries (except the base of the dorsal margin) brown, with reddish ochreous scales intermixed, and containing two tufts of dark brown raised scales, one of which is close to the dorsal margin, and before it to the base the margin is of the general hue (white, suffused with reddish ochreous), dusted a little with reddish fuscous; opposite to the dorsal tuft, just within the costal margin, is another larger raised tuft; the middle part of the wing is yellowish white, and behind it the wing is deeply suffused with reddish ochreous, containing about its middle a tuft of dark brown scales; apical part of the wing suffused with reddish ochreous and fuscous; second joint of the palpi pale ochreous yellow, externally fuscous, and the third joint is dark fuscous, except at the base and extreme tip. *Al ex.* ½ inch. Season, May.

L. fuscocristatella. N. sp.

White; second joint of the palpi with two pale fuscous annulations; antennae white, annulate with fuscous; head and upper surface of the thorax white; there is a small dark brown spot on each side of the thorax, over the base of the wings; primaries white, with two small dark brown spots on the extreme costa at the base, two other larger ones just

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within the costa behind them, one behind the other, and a small spot opposite the space between them, beneath the fold; the portion of the wing from the basal fourth to the end of the disc, included between the costa and the fold, is suffused with bluish fuscous scales, each of which under the microscope appears tipped with hoary, and the extreme costa is black; the wing beneath the fold is whitish; just before the middle is a lunate streak of dark brown raised scales, extending from the dorsal margin to the fold, and margined with white in the concavity behind; at the end of the disc are two other larger tufts of bluish brown raised scales, margined before by yellow ochreous, and opposite to them is a long, narrow, very oblique white costal streak, margined behind by a narrow, dark brown line, which separates it from a somewhat wider yellow ochreous streak, containing three small white costal streaks or spots; behind the tufts the wing is ochreous, streaked with fuscous. *Al. ex.* ½ inch. Season, June.

RECENT NOTES ON THE PHYLLOXERA FROM FOREIGN SOURCES.

[FROM "ENTOMOLOGICAL RECORD," BY TOWNEND GLOVER, IN MONTHLY REPORT OF THE U. S. DEPARTMENT OF AGRICULTURE.]

In November last, information was received from Henry Erni, United States consul at Basle, Switzerland, that the *Phylloxera vastatrix* had made its appearance near Geneva, and in December the following letter was received, which is published in full:

Referring you to my dispatch No. 95, about the appearance of the grape-root louse at Pregney, near Geneva, the riddle received lately an important solution, for the insect was discovered in the grape-houses of the Baron Rothschild, at his villa near Geneva. It is proved that some of these grape-vines were imported from England, in 1869, where the disease ocurred in grape-houses as early as 1863. From these facts the origin of the grape-louse at Pregney appears obvious.

At the meeting of the French Academy, on the 19th of October last, Professor Dumas stated that two substances had now been discovered

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capable of destroying the Phylloxera: 1st, the sulpho-carbonate of potassa, and 2d, coal-tar. Neither of these would injure the grape-plant. Experiments made on a large scale at Cognac and Montpelier, France, by delegates of the academy, were highly efficient. Both ingredients are cheap, for the price of a kilogram of each does not exceed one franc. The sulpho-carbonate of potassa is dissolved in water up to 37° Baumé, and 80 cubic centimeter ($\frac{1}{80}$ liter) poured upon every diseased grape-root. The best time is in November and March, the ground at that time being moist and the insect sure to be in winter quarters. The expense per vine amounts to about 10 centimes. Applying coal-tar, each root receives about 2 kilograms of this liquid, when it will penetrate the ground about 2 feet deep. In both cases the grape-louse is effectually killed. I am, sir, &c.,

H. ERNI, United States Consul.

We also give extracts from the report of the international congress of vineyardists, at Montpelier, France, October 28, 1874, on the same subject, from the Journal d'Agriculture Pratique, No. 46:

The floor was taken by Mr. H. Marès, permanent secretary of the agricultural society of Herault, and president of the ministerial commission. He commenced by recalling to mind the experiments of 1872 and 1873, with the Phylloxera, which were unsatisfactory on account of the invasion of the "pyrale." In 1872 a new experimental field was selected, near Montpelier, belonging to M. Michel Termand. The experiments commenced the 6th July, and comprise fifty-one methods, applied to squares of 25 vines each, the squares being separated by two rows of untreated vines, left to serve as means of comparison, and to prevent confusion in the effects of various modes of treatment. One hundred and forty methods have since been tried in the same vineyard, of which thirty-three were beneficial and nine injurious; the others appeared to have no effect. The most beneficial were as follows, the soil being chalky and ferruginous: Potassium sulphate disolved in urine; a mixture of the sulphurized manure of Berre, colza cake, and ferric sulphate; potassium sulphate dissolved in water; potash soap dissolved in water; soot; a mixture of farm-dung, wood-ashes, and ammonium hydrochlorate; cow-urine alone or with the addition of gas-tar. All the methods which have proved advantageous are also manurial, especially the salts of potash and ammonia. The injurious methods are those insecticides not manures, as carbonic sulphide, turpentine, petroleum, gas-tar, and phenic

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acid not diluted. The committee came to this conclusion : that manures, especially those rich in potash and nitrogenous substances, benefitted the affected vines.

The trials were continued in 1874 on the thirty-three squares already improved, one-quarter of each being left to see if the improvement was permanent. The total number of experiments made was two hundred and fifty-nine, extending over two and one-half hectares. The squares which were benefitted in 1872 and 1873 have in some cases this year almost returned to their original vigor, but the Phylloxera has not disappeared.

As regards the fruit, the following treatment has given the best results : 1, Yard-dung, wood-ashes, and sal ammoniac. 2, Yard-dung, wood-ashes and fat lime. 3, Cow-urine and fish oil. 4, Cow-urine alone. 5, Oil-cake. 6, Potassium sulphate and urine. 7, Cow-urine and gas-tar. 8, Soot. 9, Sulphur, salt of Berre, ferric sulphate and colza cake. The vines surrounding the squares treated were also visibly affected.

The experience of 1874 confirms and completes the results of 1872 and 1873, showing a diseased vine may at least temporarily be restored to vigor by energetic treatment. The commission considers itself justified in asserting that manures, rich in potash and nitrogen, mixed with alkaline or earthy sulphates, refuse of salt-works, soot, wood-ashes, ammonia, or fat lime, have increased the productiveness of the vines and allowed the fruit to ripen.

According to M. Marès the vine-disease is the result of combined causes, and subject to several conditions, viz.: 1. The nature of the soil, as it effects the vine and the insect, frequently a determining condition. 2. The influence of climate on the vine, and also whether or not it favors the extension of the insect. 3. The strength or vigor of growth of the vine itself, which varies according to the variety and mode of culture. The wild vine does not perish ; the stock nearest approaching it is hardly attacked.

M. Laliman spoke next, affirming that rooted American cuttings had been cultivated in localities where the Phylloxera had as yet failed to appear, either on the American or native stocks.

M. Planchon then discussed the American vines, dividing them into three principal groups: 1. The Labrusca ; berries with foxy taste. 2. Œstivalis ; berries small ; leaves deeply indented ; wooly on the veins. 3. Cordifolia, of which the Clinton is a variety ; leaves smooth, berries

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small. The Scuppernong, derived from the Cordifolia, attains a prodigious developement, one stock covering one-third of a hectare, but it is too wild. All these resist the Phylloxera better than our varieties, perhaps because they have not been so long in a state of cultivation. The insect does not extend its ravages beyond the small roots of the American varieties. But while the American vines do extremely well in France, they should not be imported where Phylloxera is unknown, for fear of introducing it, as the speaker is decided in asserting that it originated in America.

M. Max Cornu gave a summary of his experiments. He confined himself to substances giving off poisonous vapors, among which sulphocarbonates gave the best results.

M. Bouchet de Bernard, in a communication, advocated grafting French vines on American stocks, thus obtaining good vines and roots capable of resisting the attacks of the Phylloxera. M. Leissoniere supported these ideas, asserting the positive inferiority of the American vines. M. Terrel de Chênes stated that during five or six weeks the Phylloxera left its subterranean abode and crawled up the stock, hiding under the bark six inches above the ground. M. Douysset told how well the American vines grew at Roquemaure. And the session terminated with a communication from M. Petit, of Nimes, who lauded the value of coal-tar against the Phylloxera.

At 8 o'clock, 29th October, the members assembled at Comedy Square, to visit the field of Las Sorres, and view with their own eyes the results spoken of by M. Marès. The experimental field should give some consolation to our brethren of the South, for the squares of green vines in the middle of general desolation show that the genius of man may triumph over the Phylloxera, as it already has over the Oidium.

The cellar of Saporta, belonging to M. Vialla, was visited, and the excursion terminated at the vineyard of M. Gaston Bazille, near Lattes. His yards join others not yet treated for the Phylloxera, and we can hardly describe the extraordinary difference in the vines. Here they are digging up the stocks to throw away; there they are covered with leaves and vigorous branches. A part were treated with cow-urine and calcium sulphate, a part with urine alone. In another place, submersion has been tried with success, and new ditches are now being dug.

In the session of October 30, M. Lichtenstein continued an essay by M. Roessler, delegate of the Austrian government. In his country the

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grape-growers believe the Phylloxera came from America. They are opposed to destroying the vines, and believe in studying the insect and fighting it with manure and phosphates, ammonia, and potash. This treatment succeeds in porous soils, and to obtain this porosity the learned delegate had made use of dynamite, raising the ground thus from a great depth without injuring the vines. He then puts some chalk and phosphorus at the foot of the stock and irrigates. A gas is disengaged by the humidity, which destroys great quantities of insects, and by this means he obtains a crop. M. Lichtenstein added to this communication the result of his personal observations, that from the 15th August to the 15th September the Phylloxera takes wing and departs. He was not able to distinguish the sexes, but there was a time when the insect laid an egg which gave birth to the mother of the legions which devastate the vineyards. At this time the insect is within reach, and should be destroyed. In studying the Phylloxera of the vine the speaker discovered the Phylloxera of the oak.

Viscount de Saint Trivier, delegate from the Rhone, gave a history of the progress of the Phylloxera in his neighborhood, where it appeared three years ago. He pulled up some vines in April and June, but found no Phylloxera; but in July they appeared, which fact made him think, with M. Cornu, that the temperature must be at least 15° cent. He obtained good results by covering the stocks with a sort of paste made of saw-dust and coal-tar. M. Denis employed boiling water, to which he added one-tenth of tobacco-waste.

M. Loubet did not believe in medicines, but advocated patient replanting till the disease disappeared of itself, as he believed it soon would.

CORRESPONDENCE.

INTERESTING CAPTURES.

Last summer, while camping out with a party of friends on some of the small lakes north of Lake Ontario, ostensibly for the purpose of fishing, I kept on the alert for entomological rarities, and was rewarded by the discovery of two specimens of a *Grapta*, which I immediately recognized as *G. satyrus* Edw., though much astonished at the occurrence of the species so far from its usual habitat—the Pacific coast and Sierras of California—and hitherto not found at all on this side of the Rocky Mountains. Yet they were unmistakeably *satyrus*, and Mr. Edwards, on receiving one of the specimens, corroborated my opinion in the matter.

With a somewhat quickened pulse I cautiously approached the first specimen noticed, and successfully netted it; the other was secured with more difficulty, being very wild and frequently flying far into the woods, and then after a few moments returning to the patch of milkweeds where first found.

The two specimens were taken on the 22nd of July, on the shores of Cameron Lake, in Victoria County, Ont., and were the only ones seen during a stay of over a month in the neighbourhood. They were found in company with many *G. progne* and *comma* of both varieties *(dryas* and *Harrisii.)* *Argynnis cybele* and *aphrodite* were found in considerable and about equal numbers, and several specimens of *Thecla strigosa* were taken at the same place. *G. satyrus* is readily distinguished from *comma* by the honey-yellow under surface and great distinctness of the tawny fulvous marking above, that of the hind wings never being obscured by shades of deeper brown. Several specimens of *Arctia (Euprepia) Americana* were taken at our camp fires at various times during our stay; it was necessary to wait, net in hand, and pounce upon them before they were able to reach the fire, as their motions were quite rapid. The first specimen obtained was fished out from the frying-pan while culinary operations were going on—of course ruined—but others were secured in good condition by holding lighted birch-bark torches out a little distance from the shore; the moths flew down into the water and were readily captured. Several hundred eggs were laid by females pinned in the collecting box, and quite a number of the larvæ lived till winter and are now hybernating; they showed no preference as to food, but like most Arctians, devoured almost any green thing within their reach. If they survive the winter I will hereafter give an account of their transformations.

THEODORE L. MEAD, Ithaca, N. Y.

Mr. Knetzing, of this city, has discovered a locality for *B. infans.* They are found in a clump of White Birch, north of the village of Hochelaga. I believe this is the first record of its occurrence in this Province. *B. infans* is closely allied to *B. parthenais* of Europe, the caterpillars of which also feed on White Birch.

Mr. Pearson, one of our members, was fortunate in procuring a fine specimen of *Samia Columbia* from a cocoon found by him at Hochelaga.

Biston ursarius was as prolific as ever last season on the Lombardy Poplar, while the trees were as leafless as in mid-winter.

WM. COUPER, 67 Bonaventure St., Montreal, P. Q.

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The Canadian Entomologist.

VOL. VII. LONDON, ONT., MARCH, 1875. No. 3

ON SOME OF OUR COMMON INSECTS.

THE BEAUTIFUL WOOD NYMPH—Eudryas grata.

BY THE EDITOR.

This moth (see fig. 6) is truly a beautiful creature. Its fore wings are creamy white with a glossy surface, with a wide brownish purple stripe along the anterior edge, reaching from the base to a little beyond the middle of the wing. On the outer margin is a broad band of the same hue, widening posteriorly, with a wavy white line running through it, composed of minute pearly dots or scales. It is bordered internally with dull deep green. The brownish purple band is continued along the hinder edge, but it is much narrower here and terminates a little before it reaches the base. There are also two brown spots, one round, the other reniform, near the middle of the wing, often so suffused with pearly white scales as to be indistinct above, but clear and striking on the under side.

Fig. 6.

Colors, creamy white and brownish purple

The hind wings are reddish yellow, with a broad brownish purple band along the outer margin, extending nearly to the outer angle, and powdered here and there with a few whitish pearly scales; there is also a faint dot on the middle of the wing which is reproduced more prominently on the under side. The under surface of both wings is reddish yellow. The head is black, and there is a wide black stripe down the back, merging into a series of spots of the same, which extend nearly the whole remaining length of body. The sides of the body are reddish yellow with a row of blackish dots close to the under surface. The fore legs are beautifully tufted with white, the shoulder covers also are white, and so is the under surface of the body.

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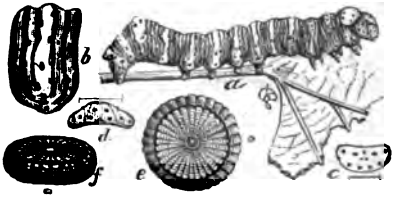
When this moth is at rest—that is, during the day time—its wings are closed like a roof over its back, and its tufted fore legs are stretched out.

The insect passes the winter in the chrysalis state, emerging as a moth from the middle of June to the middle of July. The earliest recorded date we have of the appearance of the moth is June 25th. It is usually common during the last week in June and the first in July, when it may often be found in the day time fast asleep on the leaves of the grape vine.

Soon after the moths appear they begin to deposit their eggs. These are among the prettiest and most beautiful of insect eggs; at *e*, fig. 7 (after Riley) we have a view of the upper surface, and at *f* a side view of this charming object. It is round and very flat; its color is yellowish or greenish yellow, with an enclosed ring of black placed a little beyond the middle, and sometimes nearer to the outer margin. In the centre of the egg is a large, nearly round dot, and at a little distance from this a circle of smaller dots, from which arise a series of from 24 to 27 raised striae, diverging equally as they approach the outer edge, and crossed by many gracefully curving lines which interlace also the spaces between.

Fig. 7.



When mature, the young caterpillar escapes from the upper part of the egg, lifting the centre and rupturing the portion placed over the black ring. In some cases we have observed the egg shell to be eaten by the newly hatched larva; in others it remains almost untouched. The young larvae have a strange habit of twisting their hinder segments and throwing them forward, resting on the anterior segments in a curious manner. At this age they eat small holes all over the vine leaves in different parts; they are often solitary, but sometimes two or three may be found on a single leaf.

When mature, the full grown larva appears as at *a*, fig. 7: it is then nearly one and a half inches long, tapering towards the head, thickening towards the posterior extremity. The head is of an orange color, with a few round black dots and pale brownish hairs.

The body above is pale bluish, crossed by bands of orange and many lines of black. Each segment, excepting the terminal one, is crossed by an orange band, all of which are nearly uniform in width, excepting that

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on the 12th segment, which is much wider. These are all more or less dotted with round black dots, from each one of which arises a single short brown hair. There are also crossing each segment six black lines, placed nearly at equal distances along each side, but with a wider space in the middle, where the orange band occurs. The twelfth segment is much raised, and the terminal one suddenly sloped. The under side is very like the upper, and also marked with orange and black; feet and prolegs orange, spotted with black.

The larvae feed on Virginia Creeper *(Ampelopsis quinquefolia)* as well as on the Grape-vine, and Mr. Bowles, of Montreal, has found them feeding on the Hop.

When full grown, they descend to seek some secure retreat in which to pass the chrysalis, or inactive stage of their existence. They are fond of boring into old pieces of wood, and in the chambers thus formed they find secure lodgment; they will also bore into corn-cobs. When rearing them we have supplied pieces of cork for this purpose, and have had as many as twenty-one chrysalids enclosed within two small bungs about 1½ inches in diameter, and one inch thick. The excavation is but little larger than the chrysalis which is to rest in it; it is not lined with silk, but is made moderately smooth and is furnished with a cap or cover composed of minute fragments of cork, formed into a sort of membrane by means of a glutinous secretion mixed with threads of silk. When nicely finished the surface of this cover is slightly glossy, the glossiness extending a little beyond the actual orifice, indicating that the glutinous matter has been of a thin consistence and has spread a little during its application. When the lid is lifted the head of the chrysalis is usually found quite close to it.

Fig. 8.

The chrysalis is about seven-tenths of an inch long, of a nearly uniform dark brown color, and roughened with small blackish points or granulations.

This insect is subject to the attacks of a parasite, a two-winged fly—a Tachina—probably the species known as the red-tailed Tachina fly, *Exorista leucania*, see fig. 8 (after Riley.) It is not much unlike the common house fly in appearance, is about a quarter of an inch long, with a white face, large reddish eyes, a dark hairy body with four, more or less distinct dark lines down the thorax, and patches of a greyish shade along the sides of the abdomen. The parent fly deposits

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her eggs on the back of the caterpillar, usually a short distance behind the head, where they are cemented firmly by means of a peculiar secretion with which the insect is furnished. Three or four of these eggs are usually placed upon a single caterpillar, where, after a few days, they hatch, when the tiny worms eat their way through the skin into the interior of the body, where they feed upon the fatty matters, instinctively avoiding the vital organs. When the caterpillar is about full grown it dies, and from its body emerge these three or four full grown whitish grubs, which soon after their exit change to chrysalids. These are nearly one-fifth of an inch long, oval, smooth and of a dark brown color, from which in due time the perfect flies escape.

PRELIMINARY LIST OF THE NOCTUIDÆ OF CALIFORNIA.

Part IV.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

61. Prodenia præfica Grote.

Allied to the Eastern *lineatella;* a little larger, with broader wings. The hind wings are more obscure, in the female subfuscous. The markings are so nearly alike in the two that I do not find good differences. Nevertheless, the tone of the three Californian specimens is less bright, the whitish apical shade is less defined, and the discal point beneath on the secondaries is evident and distinct, whereas it is wanting in *lineatella.* The extra basal and subterminal fields show a purply shading in *præfica.* *Expanse* 36 m. m.

California, No. 5568, Mr. Hy. Edwards; Mendocino, June, Mr. Behrens.

62. Himella furfurata Grote, Proc. Acad. N. S., Phil., 1874, p. 204.

Sauzalito, Mr. Behrens, Oct., Nos. 182 and 223.

The Californian specimens are a little darker than my type, more distinctly marked, the palpi distinctly blackish outwardly.

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63. Pyrophila pyramidoides (Guen).

A specimen sent by Mr. Behrens does not differ from Eastern material.

64. Graphiphora pacifica (Harvey), Bul. Buff. S. N. S., 2, 120.

Sauzalito, February, Mr. Behrens, No. 27 (red label).

The specimens seem merely to differ from the European *incerta* and the Eastern *alia* in tone. It is possible that all three names refer to a single species.

65. Graphiphora arthrolita Harvey, Bul. Buff. S. N. S., 2, 275.

California, Nov., No. 208, Mr. Behrens.

66. Zotheca tranquilla Grote, Bul. Buff. S. N. S., 2, 69.

California, Mr. Hy. Edwards, No. 160.

67. Orthosia purpurea Grote, Bul. Buff. S. N. S., 2, 125.

Sauzalito, Oct., Nov., No. 3 (red label), Mr. Behrens.

68. Orthosia crispa Harvey.

Sauzalito, Oct., Nov., No. 5 (red label), Mr. Behrens.

69. Pseudorthosia variabilis Grote, Bul. Buff. S. N. S., 2, 161.

Sauzalito, Mr. Behrens, Nos. 166—168, 223, September to October. Very variable in color. Specimens range from a pale fawn with nearly immaculate primaries, through reddish brown to dark olive brown with distinct markings.

70. Glaea olirata Harvey, Bul. Buf. S. N. S., 2, 120.

California, Mr. Behrens, No. 9 (red label), September.

71. Xylomiges patalis Grote, Bul. Buf. S. N. S., 1, 144, pl. 4, fig. 11.

Mendocino, Mr. Behrens. No. 18 (red label); Vancouver Island, Mr. Hy. Edwards, No. 5586.

72. Xylomiges hiemalis Grote, Bul. Buff. S. N. S., 2, 71.

Oakland, January, Mr. Behrens, No. 18 (red label).

73. Xylomiges curialis Grote, Bul. Buff. S. N. S., 1, 143.

California, Mr. Behrens, No. 8.

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74. Xylomiges crucialis Harvey, Bul. Buff. S. N. S., 2, 277.
California, No. 5575, Mr. Hy. Edwards.

75. Cucullia serraticornis Lintner, 26, Am. Rep. N. Y. State Cab., 174.
Cucullia matricariæ Strecker.
California, Mr. Behrens, No. 5.

76. Adipsophanes miscellus Grote, Bul. Buff. S. N. S., 1, 181.
Californian specimens are labelled May 8th, by Mr. Behrens.

77. Ablepharon absidum Harvey, Bul. Buff. S. N. S., 2, 275.
Oregon, No. 2734, Mr. Hy. Edwards.

78. Plusia Pasiphæia Grote, Bul. Buff. S. N. S., 1, 146, pl. 4, fig. 1.
California, Mr. Hy. Edwards, No. 152.

79. Plusia bractea (S. V.), Bul. Buff. S. N. S., 2, 72.
Mr. Behrens, Mendocino, June.

80. Plusia gamma (Linn.) Can. Ent., 6, 16.
California Mr. Hy. Edwards, 147; Vancouver Island, No. 4386.

81. Plusia labrosa Grote, Proc. Acad. N. Sci., Phil., 1874, 207.
Sauzalito, Mr. Behrens, August, No. 162.

82. Plusia Hochenwarthi (Hochenw).
California, Mr. Behrens.

83. Acerra normalis Grote, Bul. Buff. S. N. S., 2, 162.
California, Mr. Behrens, No. 61.

84. Heliolonche modicella Grote, Bul. Buff. S. N. S., 1, 116, pl. 3, fig. 12.
California, Mr. Hy. Edwards, No. 104.

85. Heliosea pictipennis Grote, Bul. Buff. S. N. S., 2, 220.
California (Mr. Crotch, Mus. Comp. Zool. Cam).

86. Adonisea pulchripennis (Grote), Proc. Bost. Soc. N. Hist., 16, 241.
California, Mr. Hy. Edwards, No. 4380.
California (Mr. Crotch, Mus. Comp. Zool. Cam.)

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87. Melicleptria diminutiva Grote, Bul. Buff. S. N. S., 1, 148.
California, Oregon, Mr. Hy. Edwards, No. 204.

88. Melicleptria Californiensis Grote, Bul. Buff. S. N. S., 2, 34.
Mr. Hy. Edwards, No. 93.

89. Melicleptria prorupta Grote, Trans. Am. Ent. Soc., 4, 294.
California, Lord Walsingham (in Am. Ent. Soc.); Mr. Crotch (in Mus. Comp. Zool. Cam).

90. Heliothis phlogophagus G. & R.
California, Mr. Hy. Edwards, No. 151; Mr. Behrens.

91. Heliothis armiger (Hübn).
California, Mr. Hy. Edwards, No. 2566; Mr. Behrens, No. 54.

92. Axenus arvalis Grote, Bul. Buff. S. N. S., 1, 152, pl. 4, fig. 8.
California, No. 106; Oregon, No. 5254, Mr. Hy. Edwards.

93. Annaphila diva Grote, Bul. Buff. S. N. S., 1, 150, pl. 4, fig. 14.
California, No. 198, Mr. Hy. Edwards.

94. Annaphila depicta Grote, Bul. Buff. S. N. S., 1, 150, pl. 4, fig. 13.
California, Mr. Hy. Edwards, No. 2260.

95. Annaphila decia Grote.

Under the number 2587, Mr. Hy. Edwards sends two specimens of a smaller species than *depicta*, differing by the want of pale and brown shades on the reniform and along the t. p. line on the fore wings. The bright yellow secondaries have the black margin much wider and distinctly limited, intruded upon centrally by the yellow ground color. Beneath the fore wings have the terminal margin black as on the hind wings, not with the subterminal black fascia of *depicta*. Otherwise in markings and appearance the two species are very similar. *Expanse* 18 m. m.

96 Annaphila mera Harvey, Bul. Buff. S. N. S., 2, 277.
California, Mr. Crotch.

97. Tarache flavipennis Grote, Bul. Buff. S. N. S., 1, 153.

Sierra Nevada, Oregon, No. 2590, Mr. Hy. Edwards. The specimens are all females, and vary in the depth of color and extent of the yellow

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central shading on the secondaries. Also that in one specimen the hind wings show a distinct median fascia beneath, usually indicated by a costal mark. In the pale yellow specimen this lighter shade replaces the deep yellow of the hind wings beneath. The t. p. line is marked by bluish metallic dots.

98. Trichotarache assimilis Grote.

♂. The eyes are constricted, naked. The antennæ naked. The body squamation is rough and hairy. The fore wings are narrow at base, with depressed costa, and widen terminally. In ornamentation the moth resembles *Tarache flavipennis.* The fore wings are olive blackish with gray or smoky whitish fringes, terminal space and median costal blotch which exhibits the black discal point as in *T. flavipennis.* The pale color also intrudes on costa before the s. t. line. The ordinary lines are fragmentary, marked by velvety points. Hind wings fuscous, yellow stained on the disc, with pale interlined fringes. Beneath yellow with blackish hind and external margins to the hind wings and costal stain, while on the fore wings there is a subterminal fuscous fascia, discal mark and costal stain above it; the fringes are pale. Body fuscous and mixed with pale hair. At first this insect looks like the possible male of *T. flavipennis,* but it differs apparently generically by the shaggy vestiture and narrow eyes. It differs in ornamentation by the terminal space being distinctly pale and by the want of metallic points on the t. p. line. *Expanse* 26 m. m.

California, Mr. Hy. Edwards, No. 2589.

99. Galgula hepara Guenée.

California, No. 2575, Mr. Hy. Edwards. The specimen does not seem to differ from my material from Alabama.

100. Galgula subpartita Guenée.

Sauzalito, Nov. 11th, No. 211, Mr. Behrens. The specimen is paler and more distinctly marked than Eastern specimens, but seems to belong to the same species.

101. Drasteria erechtea (Cramer.)

California, No. 1, Mr. Behrens. The specimens of this variable species agree with the typical form of the East, but are larger.

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102. Drasteria cærulea Grote, Bul. Buff. S. N. S., 1, 155.

California, Mr. Behrens, No. 2; Mr. Hy. Edwards, 91. Two specimens, No. 699, are sent by Mr. Hy. Edwards, labelled "Sierra Nevada." They seem merely to differ by the absence of the parallel fascia-like dark shades to the median lines.

Litosea.

This name is proposed for the Eastern *convalescens* and a new Californian species, both differing from *Drasteria* by the male antennae being bipectinate.

103. Litosea adversa Grote.

A unicoloroous grayish species, with the thread like lines extremely inconspicuous. A black dot in the place of the orbicular. The t. p. line marked by a pale shade, nearly straight and adjacent to the similarly marked subterminal line, with which it is sub-parallel. Hind wings pale, yellowish gray, with double even lines like *convalescens*, not uneven as in the species of *Drasteria*. Beneath pale yellowish gray, powdered with ochreous, usually deeper stained outwardly. Faint discal dots and indications of double outer transverse common lines. More gray than *convalescens*, and distinguishable by the pale straight outer shaded lines of the fore wings. *Expanse* 36 m. m.

California, No. 6, Mr. Behrens (green label); Mr. Hy. Edwards, No. 708.

104. Euclidea cuspidea (Hübn.)

California, Mr. Mead, No. 38; Mr. Behrens, No. 4 (green label).

NOTES ON THE LARVA OF GRAPTA FAUNUS EDWARDS.

BY F. B. CAULFIELD, MONTREAL, P. Q.

On the 6th of June, 1874, I found on a wild gooseberry bush four larvæ of *Grapta faunus* Edwards. Length of full grown larva, 1¼ inch; form cylindrical; head flat in front, black, furnished with two branching horns and a few scattered white hairs; a yellow V-shaped stripe in front; the base between the horns, the ends pointing towards the mandibles; mandibles black.

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Upper surface, second to sixth segments brick red, striped transversely with blue, yellow and black lines; a few white hairs on second segment; four branching yellow spines with black tips on third and fourth segments; six on fifth and sixth; seventh to twelfth segments white, with a faintly marked black dorsal strip; each segment with three transverse yellow bands and two oblique black spots; seven branching spines on each segment, viz., three on upper surface white, one on side brown, and one close to under surface white; two last segments black—twelfth with seven spines, five white and two brown; thirteenth segment with four white spines. Sides red, with two black bands, the lower band spotted with blue. Under surface grey, striped transversely with black. Feet and prolegs black.

These larvae suspended themselves to the lid of the box in which they were confined by a small button of very light pink silk, on June 18th, 1874, and in about twenty-four hours changed to grayish brown chrysalids. Head with two bi-forked horns, the outer point very short; thorax with an elevated keel-like ridge on top, with a small tubercle on each side. At the base, below this, there is a larger tubercle, and behind it another keel-like protuberance, hollowed on top; there are six raised silver ornaments on the dorsal surface, the first resembling in shape a capital G; the second is an oblong spot, and the third is a sharply-pointed tubercle. The abdominal segments are furnished with eight rows of tubercles; on each side are five brown spots, decreasing in size towards the posterior extremity, and below the spiracles there is a brown stripe. Under surface gray, with ten brown spots.

The first butterfly emerged from chrysalis on July 3rd, 1874, the second on the 4th, the third on the 6th; the other died in chrysalis.

These larvae fed freely on wild gooseberry, but I do not think it is its favorite food, as these were the only larvae of *faunus* that I could find, although I searched closely for them. Mr. Edwards informs me that Mr. Scudder found the larva of *faunus* on Willow, and that may be its principal food plant here, for *faunus* was very plentiful here last season (1874), and if the larvae had been common on the Gooseberry I must have found them, as I examined numbers of the bushes, finding plenty of larvae of *G. progne*, but only four of *faunus*.

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TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 35.)

LAVERNA.

Corrigenda:

The publication of the paper on this genus in the February number of this magazine, in its present form, was unfortunate, and resulted from a misunderstanding by the Editor of a letter addressed by me to him. The paper was prepared from specimens contained in Mr. Belfrage's first collection, and was sent by me to the Editor some months ago. Further study of that collection and of additional material, induced me to suppress some of the descriptions and to amend others, and with a view thereto I requested a return of that portion of the mss. Unfortunately my letter was misunderstood. and the wrong mss was returned to me, while the paper on Laverna was published. The following corrections will, I hope, prevent any confusion which might otherwise arise.

For *L. lyonetiella*, wherever it occurs in that paper, read *L. œnotheræella*. *L. lyonetiella* was the original mss name, given from its resemblance in ornamentation to some species of Lyonetia. Afterwards, on discovering the food plant, the name was changed to *L. œnotheræella* at p. 30 *ante*, but the correction was not made throughout the paper.

For *L. ignotilisella*, p. 33, read *L. ignobilisella*. The description of this species is imperfect, and was intended to be suppressed. It is not in my power now to improve it.

For *L. fuscocristatella*, p. 34. I am satisfied from further study that this description was made from damaged specimens of the species described by me in the January number as *Nœra fuscocristatella*. Naera is preoccupied among Mollusca, and I substitute for it Leuce. It is more nearly allied to Gelechia than to Laverna.

For *L. miscecalonella*, p. 34, read *miscecolorella*. The following description is at least an improvement on the former one:

Vertex and antennae brown; face and inner surface of the palpi ochreous yellow; outer surface of the palpi brown, except at the base and extreme tip, which are ochreous yellow; thorax on top and basal third of

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the forewings dark brown, with some reddish ochreous intermixed, especially about the base of the hind margin, which is paler than the remainder of the basal portion of the wing; in the basal costal part of the wing are two small dark brown tufts, which, from their obscurity, are likely to escape observation; near the posterior margin of the brown basal portion are two large dark brown raised tufts, one of which is nearest the costal and the other to the dorsal margin, the *latter* being the largest. The middle third of the wing is pale ochreous, with a faint reddish tinge, and is crossed a little obliquely by three almost confluent raised tufts of the same hue, which, without very close observation, will be mistaken for a continuous transverse row of raised scales, or for two tufts, one costal, the other dorsal. In this middle portion of the wing the extreme costa is marked by numerous small dark brown spots, and the tuft is dark brown on the costal margin, and there are one or two small dark brown spots on the disc. Following this middle ochreous portion of the wing is a rather narrow and irregular band of dark brown and reddish ochreous scales, containing a large dark brown tuft on the dorsal margin, and some raised scales near the costa. Immediately behind this band is a whitish spot on the costal margin, while on the dorsal margin the brown band extends back along the margin of the dorsal ciliae to the apex, and contains a row of minute dark brown slightly raised scales, extending around the apex at the base of the ciliae, which are brownish gray. The under surface of the body is whitish, and the legs and tarsi are dark brown with white annulations. *Al. ex.* a little over half an inch.

To the naked eye the anterior and apical parts of the fore wings are brown, and the middle third stramineous.

The neuration is that of Chauliodus, except that only four, instead of five veins are given off from the cell to the hind margin, but the fifth is indistinctly indicated. The tongue is scaled (naked in Chauliodus), the second joint of the palpi is scarcely clavate and is shorter than the third, and the tufts do not project over the margins of the wings as in Chauliodus, and the somewhat elongate basal joint of the antennae has no hairs depending over the eyes as in that genus. The neuration and palpi are very nearly that of *Perimede erransella* Chamb.; perhaps they ought not to be separated generically, and, indeed, as to this species and the other Texas species in this collection, I am not sure that they should be included in Laverna, though if they are separated from it, several of the recognized European species would with equal reason be also separated from it, and more than one new genus would have to be *created*. In

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truth, I am unable to determine what constitutes a true Laverna. *L. cephalanthiella* Cham. is probably nearer it than any other American species; but the species referred to this genus by European authors differ greatly in structure, more greatly, perhaps, than do those which I have referred to it. I doubt greatly whether any well marked lines separate it from Chauliodus, Chrysaelista, or even from Theisoa and Elachista.

L. obscurusella. N. sp.

The tongue is scaled as in Laverna, but the labial palpi are those of *Chauliodus chærophilellus;* the basal joint of the antennae has dependent hairs, and the tufts of scales, though not projecting over the hind margins of the wings, as in Chauliodus, are arranged along the dorsal margin. As I have but a single specimen, I have not denuded the wings.

Head and palpi white; third joint of the palpi is externally marked with about three or four small purple brown spots, and the second joint is externally dusted with scales of the same color towards the base. Antennae brown. Thorax white on top, but marked with some small brown specks, some of which also are scattered over the base of the fore wings, which are white with a large pale yellowish ochreous spot, which crosses the fold at about the basal fourth. The wing behind this spot to the tip, is more or less, though faintly tinged with pale ochreous yellow and grayish, especially so along the middle of the disc, where there are two or three small dark brown tufts of raised scales; there is a bluish gray spot on the dorsal margin before the ciliae, and there is an opposite costal spot of the same hue which also is visible in the ciliae: there are three small tufts of ochreous red scales along the dorsal margin of the fore wings, one of which is near the base, another about the middle, and the third is just behind the bluish gray patch above mentioned. The legs are brown and the tarsi are annulate with white. *Al. ex.* 3/8 inch.

Additional corrigenda:

Ante p. 30, for L. longiella read langiella.

P. 32, for superbella read elegantella.

P. 10, for buristriga read brevistrigella, and for planisipenella read planipenella.

V. 6, p. 237, pallidagrisseella read pallidegrisseella.

P. 244, for pallidastrigella, pallidestrigella.

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BUCCULATRIX.

B. niveella. N. sp.

Snow white, very faintly tinged with yellowish on the front of the tuft and in the apical part of the fore wings, and with a very few scattered brown scales in the costal ciliae, but with two distinct dark brown hinder marginal lines in the dorsal ciliae, one at their base, the other beyond their middle, slightly converging towards the apex. *Al. ex.* a little under half an inch.

The two following species I place with a little doubt in this genus. In Bucculatrix the tongue is short, but with careful observation of both these species, and dissections of one of them *(B. ? magnella)*, I have been unable to discover any trace of a tongue ; the tuft also is larger than is usual in Bucculatrix, and in the hind wings of *B. magnella* the apical vein goes *to* the apex, and the median gives off only a single branch, instead of two. It is also a large species for the genus.

B. magnella. N. sp.

Snow white. There is a rust red spot on the front of the tuft ; a dark golden brown streak along the middle of the fore wings, beginning on the base, but in the apical part of the wing curving down to the base of the dorsal ciliae, and extending thence around the apex. There is another narrow streak of the same hue parallel to it, which begins behind the middle of the wing, and is usually partly confluent with it, and after reaching the base of the dorsal ciliae, it passes on to and through the apical ciliae. There is a dusting of ochreous scales along the base of the costal ciliae, and the apex is suffused with reddish ochreous. *Al. ex.* fully half inch. Season, April and May.

B. immaculatella. N. sp.

No tongue? Silvery white, immaculate. *Al. ex.* $\frac{5}{16}$ inch. Season, May.

BUTALIS.

B. brevistrigella.

This is a very variable species, or my specimens represent more than one species. Sometimes (as stated in the former description) there is simply a yellow streak on the fold, which is sometimes interrupted. In others there is no distinct streak on the fold, but the dorsal margin to the fold, and crossing it near the base of the wing, is densely dusted with pale ochreous yellow, thus approaching *B. dorsipalidella*, which may possibly be an extreme variety of the same species.

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ERIPHIA *gen. nov.*

Allied to Elachista and Laverna. Indeed, but for the more elongate palpi, and without having examined the neuration, I should have placed it in Elachista.

Palpi rather long, drooping in the dead insect, divergent; third joint pointed and about half as long as the second. Antennae simple, about as long as the body.

Primaries lanceolate; the submedian is furcate at the base; the cell is truncate (the subcostal and median running nearly parallel, and the discal vein being straight); the subcostal gives off three branches before the end of the cell, and a fourth at the end has a common origin with the fifth or apical branch, which goes to the apex; the discal has a central branch to the dorsal margin, and the median is furcate from the end of the cell, both branches being short. It thus resembles *L. astra* or *L. longiella*, Ins. Brit.

Secondaries linear lanceolate. Internal and submedian veins distinct, the latter furcate on the dorsal margin; median obsolete to the end of the cell, where it divides into two distinct branches; discal short, distinct, closing the cell about the middle of the wing; subcostal indistinct to the end of the cell, where it becomes distinct and bends up to the costa just beyond the middle. (Possibly, however, it would be more correct to consider what I have called the 'internal' as the submedian, and what I have called 'submedian' as the median; and what I have called the 'median' as a furcate branch of the discal continued faintly through the cell to the base. If this view is correct, then the cell is unclosed between the submedian and the furcate discal branch, and thus the neuration of both wings would *resemble* those of *L. longiella*, and the insect would be a Laverna.

E. concolorella. N. sp.

Dark bronzy brown; unicolorous. *Al. ex.* ⅓ inch. Season, July.

ELACHISTA.

E. ? concolorella. N. sp.

Without the aid of a lens, this insect would be mistaken for the preceding. It is, however, quite distinct. The antennae are but little more than half as long as the wings, and the palpi are not much more

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than half as long as in *Eriphia concolorella.* I place it somewhat doubtfully in Elachista, because of the neuration, which approaches that of Laverna. The submedian of the primaries is not furcate at the base; the cell is narrow and acuminate, with three subcostal branches to the margin from near the end of the cell, besides the apical branch, which is furcate before the apex, with one of its branches to each margin; the median is also three-branched, the last from the end of the cell almost confluent with the furcate apical branch of the subcostal.

In the secondaries the cell is rather wide, unclosed; the subcostal is distinct and furcate, with a branch to each margin; the median is three-branched (or two-branched, with an independent discal branch arising *at* the median and indistinctly continued through the cell, which is unclosed).

Dark bronzy brown; unicolorous. *Al. ex.* a little less than a third of an inch. Not so slender an insect as *Eriphia concolorella.*

E. parvipulvella. N. sp.

White; a few ochreous yellow scales scattered over the primaries, especially towards the apex. *Al. ex.* scarcely ¼ inch. Season, May, July, August and September.

CORRESPONDENCE.

YOUNG OF POLYXENUS.

DEAR SIR,—

During the past summer I have bred the young Polyxenus from the egg. The eggs were found under the bark of dead pines, and were in masses of about thirty, I should judge; intermixed with them were numerous hairs from the posterior part of the body of the adult. The eggs are translucent white, sometime before the young appear turning somewhat opaque; in shape oval, long diameter barely one-hundredth of an inch.

Length of the young ten hours from the egg, seven two-hundredths of an inch. The young differ in no marked manner from the adult, except in the smaller number of segments, which are four, and in having only three pairs of legs, attached to the three anterior segments. The fourth segment is small and has the two tufts of silvery hair so characteristic of the adult. HENRY L. MOODY, Malden, Mass.

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CROCIGRAPHA.

DEAR SIR,—

On page 250 of the CAN. ENT., Mr. Morrison doubts the propriety of the generic reference of *Perigrapha Normani* Grote. I had previously (Bull. B. S. N. S.) noted the different antennal structure of the American species, not being acquainted autoptically with the European forms. The species of *Perigrapha* are regarded as related to *Taeniocampa* by Lederer, and it was natural that in describing an American species, differing by the presence of a prothoracic tuft, that I should refer it to a genus differing by this character from *Taeniocampa*, to which otherwise both were related. Lederer has divided the genus *Taeniocampa* (which should now be known, as I have shown elsewhere, as *Graphiphora*) into sections already, on peculiarities of antennal structure. There can be no propriety of further enlarging the genus by the admission of species with a tufted thorax, so that I propose the above name for *C. Normani*.

DEAR SIR,—

In Mr. Morrison's letter on page 16 of this volume of the CANADIAN ENTOMOLOGIST, he allows himself to call my statements with regard to certain recently described species, "palpable blunders." In the course of his paper, however, the synonyms I claimed that Mr. Morrison has made are admitted, with the exception of two, *Hadena rasilis* and *Agrotis exsertistigma*. With regard to the former insect, I think it much more nearly resembles Hübner's figure of *grata* than *Graphiphora oviduca* does in habitus, size, ornamentation and color, and my blunder (if I had made one) can hardly be called "palpable." With reference to *Agrotis exsertistigma*, I find that I am in error and that the species is valid. I have not known until now the true *exsertistigma*. Mr. Morrison founded this species on two specimens sent him by myself for description with other material, but neither were returned me with the other specimens. Having no duplicates of the material sent him, I inferred that *exsertistigma* was based on specimens with open orbicular, which I referred to *alternata*, but which I now see are Californian specimens of *A. cupida* Grote. Mr. Morrison's non-return of the specimens merely confirmed me in my own wrong identification of *alternata* Grote, as found in California. I am exceedingly sorry to find myself in double error. In the present case the description of Mr. Morrison has helped to mislead me, since *exsertistigma* has a conical abdomen and should not be compared with either *alternata*

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or *cupida*, which have it flattened, while *cupida* varies in California in a character (the open orbicular) which Mr. Morrison uses to separate *exsertistigma*.

To the list of synonyms I have given as recently made by Mr. Morrison, Mr. Morrison adds that of *Orthosia baliola*. They would therefore stand as follows:

1. *Copipanolis vernalis* Morr. = *Eutolype Rolandi*.
2. *Mamestra illabefacta* Morr. = *Mamestra lilacina*.
3. *Anthoptera nigrocaput* Morr. = *X. Ridingsii*.
4. *Orthosia baliola* Morr. = *Apamea purpuripennis*.
5. *Hadena rasilis* Morr. = *Elaphria grata*.

Of these five synonyms, one (No. 4) I had not detected, one (No. 5) is not conceded by Mr. Morrison and three (Nos. 1-3) are now admitted by him.

Mr. Morrison is in error in stating that I remark that his *vulgivaga* is "probably a re-description of *H. apamiformis*." I quote the species on page 215 as a distinct species unknown to me, and merely say "from the description I think it not improbable," etc., which is a very different thing. I make no positive statement with regard to either *sericea* or *vulgivaga*. I am glad that *sericea* is not founded on the specimen sent me as a "n. s." allied to *apiata*, because that *was apiata*. I thought *sericea* might be the insect, because Mr. Morrison disputed my determination and thought it distinct, and because he speaks comparatively of *apiata* in his description of *sericea*.

In CAN. ENT., 6, 250, Mr. Morrison states that "Mr. Grote refers *Ceramica* to *Taeniocampa*." In my paper (Bul. Buff. S. N. S., 2, 122) I give the genera (as elsewhere) separately and distinctly, but cite their names under the same heading in a short synoptical table, with the remark, "I have no perfectly preserved specimens of *Ceramica exusta*, and the structural difference from *Taeniocampa* is not apparent to me," as an excuse for so doing.

Mr. Morrison's remark as to my identification of *Agrotis lycarum* I think is unfairly put. This identification was always made hesitatingly from a figure, and had been finally abandoned before Mr. Morrison had written on the subject. Again, *repentis* G. & R. was described in Europe and the name a ms. one of Guenée's. That we had not then identified *messoria* was, perhaps, pardonable, Mr. Riley also having redescribed Harris' species as *Cochrani*.

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I notice, also, Mr. Morrison's remark that I have mistaken the generic characters of *Hydroecia semiaperta*. This species, with hairy eyes, is placed by Mr. Morrison first in *Hydroecia*, a genus which has the eyes *naked*. It was sent to me as a n. s. of *Hydroecia* by Mr. Morrison for examination, and I then returned the species determined as belonging to a genus allied to, but distinct from *Hydroecia*. In the Proceedings of the Academy I merely discuss the priority of the names *Apamea* and *Hydroecia*, show that they are synonyms, and adopt *Apamea* and refer *all* the American species described under *Hydroecia* to *Apamea*. Among them is Mr. Morrison's *semiaperta*. There is not a word as to the structure of the species, and, in fact, I refer to *semiaperta* in the next description as *Hydroecia semiaperta*. It was not my intention then to discuss its structure or erect the new genus, to which I have always in letters stated it to belong.

Mr. Morrison speaks of *nigrescens* as a synonym of *fasciolaris*. I have examined and determined both species as distinct from specimens in the collection of the American Entomological Society. The two are totally, and, I believe, even generically different.

Mr. Morrison allows himself to make an extraordinary statement with regard to one of the few generic names proposed in my List and its Supplement, to the effect that such names without further description need not be adopted. Independent of the fact that it is customary to retain such names as can be proven by the works of Hübner, Ochsenheimer, Walker and many others, the view taken by Mr. Morrison is untenable from the consideration that I have indicated my type and clearly circumscribed the genus by an enumeration of the species in every case. Science is occupied by the fact and not the name; by his criticism Mr. Morrison shows himself affected by the name and not the fact. There can be no doubt that I have made such genera recognizable by including under them described species and thus facts and things admitted by science as existing and already defined. My generic names are as strictly to be preserved in these cases as if they were defined with the minuteness which characterizes Mr. Scudder's definition of *Papilio*. Take, for instance, my genus *Eucoptocnemis*, proposed in my List for the *Heliophobus fimbriaris* of Gueneé. Even the Etymology of the name suggests my reference to Gueneé's statement that his species has armed tibiæ, and my inference that then it cannot be a *Heliophobus*, which has them unarmed. If from such data as this no conclusion can be drawn and no action taken by a

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student in my capacity, then large numbers of terms throughout Zoology are liable to be overturned any moment by persons as ill-advised as Mr. Morrison. I cite, for example, Mr. Allen's recently described *Loligo Hartingii*, determined specifically upon a figure.

It is true that Mr. Morrison takes no regard as to the meaning of generic terms, and hence has probably taken no cognizance of the derivation of *Eucoptocnemis*, since he establishes himself a new genus under the name *Eutricopis* (my term *Tricopis* with a common prefix), which belies its designation in having the tibiæ unarmed! Mr. Morrison incorrectly refers *Eucoptocnemis fimbriaris* to my genus *Pteanectopoda*, where it does not belong, just as he incorrectly refers *Eutolype Rolandi* Grote, under the synonym *vernalis*, to my genus *Copipanolis*, where it is equally out of place.

My List of the Noctuidæ will amply attain the ends proposed if it will continue to call forth corrections and additions, and so be of service in perfecting a knowledge of its subject, the Noctuidæ of N. America.

A. R. GROTE.

Buffalo, N. Y.

DEAR SIR,—

I got a number of larvae of *Papilio asterias* in July, 1874, in Fulton County, Ohio, three of which changed to pupae. One of the pupae I poured chloroform over, and when it stopped moving, put a pin through it. A few days after I looked at it, and found it had grown almost black about the wing cases. I broke off the piece of the pupa skin that covers the head, legs and antennae, and was surprised to see it move. The wings would get dry sometimes, and I would put a drop of water on them to keep them moist. At last the time came for hatching, and with my help, the butterfly got out of the pupa case, but could not expand on account of its wings being dry. Yours truly,

ALLEN Y. MOORE.

Fort Buford, D. T.

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The Canadian Entomologist.

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SUGARING FOR NOCTUÆ.

BY GEO. NORMAN, ST. CATHARINES, ONT.

Having been requested by the worthy Editor of this journal to contribute a few hints on sugaring for Noctuæ, I have endeavored to put together a few notes that may prove serviceable to those who may not have been successful in this method of capture. To begin with, it ought to be a golden rule never to abandon a locality, even should it yield nothing for a few nights. Often have I sugared a new locality night after night, with absolutely no results, but by persevering the moths have become attracted to the place, and, in course of time, were swarming on every tree.

The mixture I have found to answer best is either the common black treacle (not refined syrup), or the very coarsest brown sugar, called, I believe, by the trade, "Jamaica foots." In either case, the sugar or treacle must be thinned down to a proper consistency by means of stale ale, or, what is still better, the thick yeasty residuum from an ale or stout cask. Some collectors add a drop or two of oil of aniseed, and just before brushing on to the trees, a small quantity of rum, but I have really found no benefit from either addition. My receptacle for the mixture is made of zinc, flattened at the sides and rounded at the corners, so as easily to slip into my shooting-coat pocket. It has a brass screw at the neck, with a leather washer, the handle being attached to the brush—an ordinary painter's "sash tool,"—and goes inside the neck and is screwed tight when in the pocket. By this means all soiling the fingers is avoided.

On arriving at my ground, I look for a round with plenty of young trees with stems under twelve inches in diameter, selecting a place interspersed, if possible, by walks and footpaths. The thick, dense portions of woods are of no use, but the outside trees will do very well, provided the trees are not too large and the trunks too rough and corky; choose the trees

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of medium roughness, for perfectly smooth ones, such as beech and young poplars, are as bad as those too rough, and rarely pay for the trouble. Spread the mixture on the leeward side of the tree, in a longish patch, at about the heighth of your face from the ground, as near sun set as possible as to time. Then comes a quiet pipe or two until it is dark enough to light the lantern. Never smoke when examining for moths, or you will lose many a rarity. When quite dark, light the lamp and go carefully over the trees.

My lantern is a portable flat one, burning the vapor of benzoline, and is, I believe, called a "sponge spirit lamp." It is far more cleanly than oil. The lantern has a drawer for matches, and instead of having a "bull's eye" in front, has a circular piece of plate glass, with bevelled edges. This arrangement allows the light to spread more than the "bull's eye," and enables one more easily to take the moth with the net, should it try to escape. No one ought to rely upon his chip boxes or cyanide bottle alone, when he goes his round; some moths are proverbially skittish, or fall to the ground and are lost among the herbage, if a hand net is not placed beneath them. The old plan of using a chip box for each specimen is, I think, the best, but many prefer the cyanide bottle. If the moths are left for twelve hours in the bottle they lose much of their rigidity.

In barren places, without trees, the sugar may be applied to stones and rocks, and on the sea shore or on sand hills, pieces of chip or wood may be sugared and stuck in the ground; or, in the event of these being not procurable, heads of thistles or bents *(Ammophila)* may be tied into bundles and smeared with the enticing lure; such localities often yield rare *Agroti.* I have generally found damp, dark nights, with a soft breeze blowing, the best, but have also had most excellent collecting even during the most brilliant moonshine. Some writers recommend sugaring a tree every ten yards or so; my plan has been to sugar every suitable and accessible tree, however near each other. In the spring the catkins of willows and sallows ought to be visited and carefully examined by means of a bull's-eye lantern. Many hybernated moths will be found in company with the Tæniocampidæ. Again, in the autumn the flower spikes of the common reed *(Arundo phragmites)* should be visited after nightfall. In my excursions I usually carry my apparatus, lamp, &c., in a leathern wallet, which is suspended by rings to a stout leather waist belt. This arrangement leaves the shoulders and chest free.

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HINTS ON COLLECTING COCOONS OF THE LUNA MOTH—*Tropæa luna.*

BY ROBERT BUNKER.

Many Entomologists are under the impression that the cocoons of this species and *polyphemus* are exactly alike in appearance. This is a mistake; and the collector who has been misled by writers on the subject and has got together by careful searching a dozen cocoons, expecting at least to get a small share of *lunas* from them, is greatly disappointed when they change to find them all *polyphemus.*

Having had some experience in collecting cocoons of both species, I will endeavor to point out the differences. The *polyphemus* cocoons are white. or dirty white, 1.25 to 1.75 in. long (those producing females the largest), with rounded ends; sometimes angular, caused by leaves being moulded unevenly to the surface; generally coated with white powder; firm in texture, and producing silk of a coarse quality.

The *luna* cocoons are chestnut brown, a little larger than *polyphemus;* egg shaped; very thin, and frequently rough on the surface, covered with warts and excrescences; they seldom show the print of leaves on their surface.

From my own observations, I am strongly inclined to the opinion that the larva of this fair queen of the night seldom spins its cocoon between leaves in the tree, but crawls to the ground and fastens it to any object that comes in its way. This belief has been strengthened by frequently finding cocoons with grass moulded to their surface; furthermore, last fall I found a cocoon firmly attached to a tuft of grass six or eight inches from the ground, and another fastened to a twig or sucker about the same distance from the ground; add to the above the fact that cocoons are almost always found on the ground near the trunk of the tree, and we have a pretty clear case that the habits of this elegant species are quite different from those of *polyphemus.*

Hickory, Beech and Oak are the food plants of this species; *polyphemus* has a much wider range, and is, consequently, far more numerous. In collecting I find about six of the latter to one of the former.

Spring is the best time to search for cocoons, as most of the leaves blow away during the winter, leaving the cocoons exposed to view; it is best, however, to look for them both in fall and spring.

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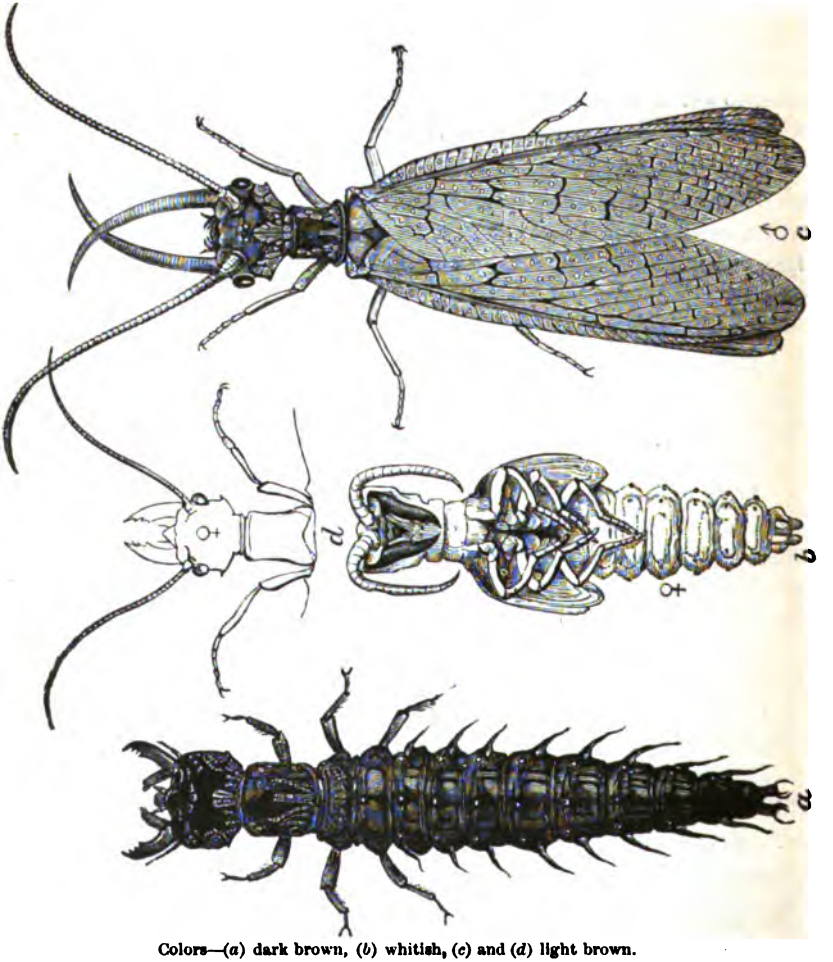
ON SOME OF OUR COMMON INSECTS.

THE HELLGRAMMITE FLY—Corydalis cornutus Linn.

BY THE EDITOR.

This insect is common throughout Ontario, and wherever found, either in its larval or perfect state, excites astonishment and curiosity, owing to

Fig. 9.



Colors—(*a*) dark brown, (*b*) whitish, (*c*) and (*d*) light brown.

its immense size and formidable appearance ; it is not, however, in any way poisonous, as some imagine. In fig. 9 this insect is represented in

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its several stages, while in fig. 10 the perfect female is shown with wings expanded. The larva, which is a diabolical looking creature, is seen at *a*, fig 9 ; it spends the earlier portion of its life in the water, crawling and swimming about upon the bottoms of rivers and streams, feeding upon

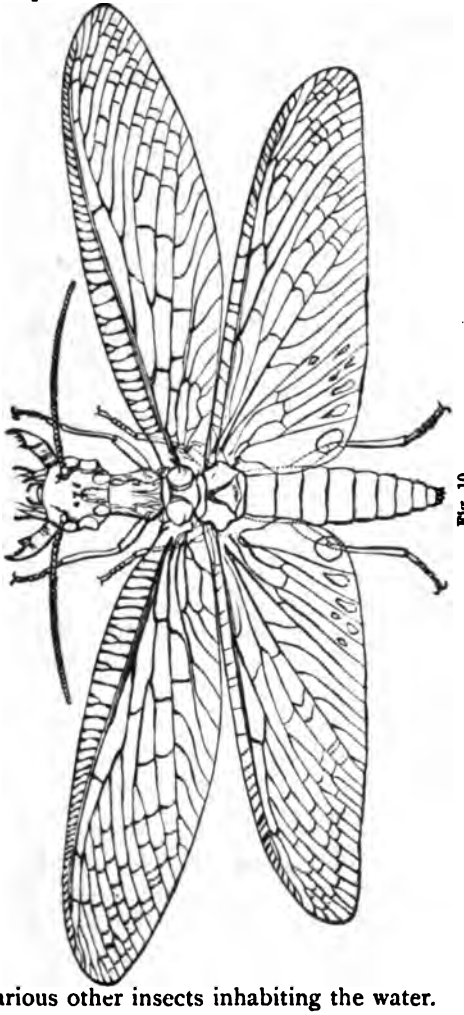

Fig. 10.

the larvae of various other insects inhabiting the water. Mr. Riley has published an excellent paper on this insect in the first volume of the *American Entomologist*, from which most of the remarks following are condensed.

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Most aquatic larvae spend the period of their chrysalis state in the water, and only emerge therefrom when ready to pass into the perfect or winged state; but the insects forming the group to which this larva belongs, leave the water while they are still in the larval state, and do not usually become pupae for several days or even weeks thereafter. Hence the Creator, to meet their necessities, has given them a double system of respiration—a set of gills to breathe with in the water, and a set of breathing holes, or spiracles, to breathe with upon land. In this larva the gills assume the form of paddle-like appendages, and are placed one pair upon each of the seven front segments of the abdomen, while the spiracles are arranged in the usual manner along the sides of the body. After leaving the water the larva crawls rapidly about, chiefly in the night time, in search of a safe and suitable place in which to spend the chrysalis stage of its existence, usually selecting the under surface of a flat board or log, or burrowing under some large stone. Before attaining its object, it sometimes wanders as much as a hundred feet from the water's edge, and an instance is given of one which crawled up the wall to the roof of a one-story building, and then tumbled accidentally down the chimney, to the great dismay of the good woman of the house. At this stage of their existence they are sometimes used by fishermen for bait, and having a very tough skin, one larva often suffices to catch several fish. They can pinch pretty sharply with their strong jaws, and they use the processes at their tail to assist them in climbing.

After a suitable hiding place has been selected, the larva forms a rude cell in the earth, and here changes to an inactive chrysalis (see fig. 9, *b*.) In this figure the wing cases are slightly spread apart from the body to show their shape and structure, whereas in nature they are closely appressed to the sides of the body. The larva leaves the water usually about the beginning of June, and by the end of that month, or the beginning of July, the perfect insect bursts its bonds and appears in the winged state.

In this form it measures, when its wings are spread, from four and a half to five inches; these, as shown in the figure, are gauze-like and covered with an intricate network of veins. The forewings are streaked with dark brown and sprinkled with whitish dots, of which latter there are also a few on the hind wings. The male (fig. 9, *c*) is remarkable for its enormous jaws, which are very long and hook-like, while the female (fig. 9, *d* and fig. 10) has short jaws. The flies hide themselves in obscure holes and corners during the day, and become active as the shades

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of evening gather. They frequently fly into houses situated near running water, soon after dusk, attracted probably by the light.

The eggs of the Hellgramite Fly are oval, about the size of a radish seed, and of a pale color, with some dark markings. They are usually deposited in patches, upon reeds or other aquatic plants overhanging the water, where, when hatched, the young larva may find ready access to that element which is destined to be its home until the end of the following spring.

PRELIMINARY LIST OF THE NOCTUIDÆ OF CALIFORNIA.

Part V.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

105. Agrotis vittifrons Grote, Proc. Ent. Soc. Phil., 3, 527, pl. 5, fig. 6.

Nevada, Mr. Hy. Edwards, No. 5645, one ♀ specimen. I think I may have mistaken the sex of my original type, and that it is a male. The present specimen seems to differ by the costal band and collar being leathern brown, the orbicular tolerably distinct, and the cell suffused with blackish. The hind wings are blackish fuscous.

106. Agrotis silens. N. sp.

♂. The antennæ are brush-like. Fore wings hoary over fuscous, with the costal region and stigmata gray. A black basal dash and black shading on the cell between the ordinary spots, which are moderately sized, sub-equal, the orbicular incomplete superiorly. Ordinary lines obsolete. The t. p. line indicated by geminate marks on costa above the reniform, and elsewhere feebly noticeable. Veins indistinctly darker marked. The black cell shading less distinctly continued to s. t. line between veins 4 and 5. Subterminal line indistinct, gray, preceded by more or less distinct black interspaceal marks. Apical shade gray; terminal space darker, fuscous. Terminal line black, fringes pale fuscous tipped with a faintly brown basal shade, and improminently interlined with

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pale. Hind wings whitish, smoky about the margin, with white fringes. Thorax and head like fore wings, Collar with a black line. Front with two short black lines. Lower portion and tips of palpi pale. Abdomen griseous, with a stigmatal black line. *Exp.* 35 m. m.

This species is stouter than *rudens*, of a rougher appearance, and it differs by the more deeply stained hind wings, the open orbicular and the general color. The fore tibiæ are wanting in the specimen.

Nevada, Mr. Hy. Edwards, No. 5603.

107. Agrotis excellens Grote, Proc. Am. Ent. Soc. (1875).

Vancouver's Island, Mr. Hy. Edwards, No. 5570.

108. Agrotis intrita Morrison, Proc. Bost. S. N. H., 1874, 164.

♂. Antennae coarsely brush-like. All the tibiae spinose. Rich deep brown, with an olive ochre stain, which tinges the thorax and the markings of the fore wings. Thorax and head concolorous with fore wings. These latter are of so intense and even a color that the markings are obscured. The ordinary lines are deep blackish, geminate, with paler fillings. Orbicular round, the black annulate with a pale interior lining. Claviform rather large and pointed. Reniform moderate, with an indistinct interior annulus, the stigmata well separated and without discal suffusion. T. p. line lunulate, even in its general course, not inwardly bent below the median vein. Subterminal line indistinct, pale, of the usual irregular shape, continuous. The dark fringes are interlined with pale. Hind wings and fringes unicolorous, light fuscous, without marks. Abdomen like hind wings, with ruddy lateral and inferior tinting. Beneath the wings are without lines, clouded, subirrorate, hind wings with an obsolete point and largely pale inferiorly. *Exp.* 30 to 32 m. m.

Mr. Hy. Edwards, Nos, 5646, 5640, 5607, Vancouver Island.

Mr. Morrison has identified a specimen without which I could not have known his species, since he compares it briefly with *phyllophora*, to which it bears no near resemblance.

109. Agrotis pastoralis. N. sp.

♀. Antennae simple; all the tibiae spinose. Wings elongate. Thorax and fore wings dull black. All the markings faint. Orbicular small, spherical, interlined with pale powdery scales. Reniform of the usual shape, well removed from the orbicular, more prominently interlined with

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pale powdery scales than the orbicular. Lines obsolete. Hind wings wide, blackish fuscous, without marks. Fringes white outwardly. Beneath paler, irrorate, with shaded faint common band and discal marks. *Exp.* 42 m. m.

Vancouver Island, Mr. Hy. Edwards, No. 5638.

This is a large species, differing decidedly from *velleripennis*.

A specimen sent by Mr. Theo. L. Mead, collected in Colorado, differs by the general tone being more fuscous, less blackish, with the t. p. line faintly legible. I think it is the same. Mr. Mead's number is 51.

Agrotis gagates. N. sp.

♀. A single specimen collected by Mr. Mead, in Colorado, and sent to me under the number 56, is closely allied to *pastoralis*, but differs by the color of the fore wings and thorax being of an intense red brown, very much like that of *Hadena lateritia (dubitans* Walk). The abdomen is red tinted beneath. The subterminal line is pale, distinct, powdery, continued, of the usual irregular shape. There is no trace of it in *pastoralis*. *Expanse* 43 m. m.

In this Coloradian species the t. p. line is visible through a lighter succeeding tinting; it is not bent down below the cell, and is slightly and regularly lunulate.

110. Bolina hadeniformis Behr. Trans. Am. Ent. Soc., 3, 25.

Downieville (Behr.) Unknown to me. Dr. Behr also describes specimens doubtfully under the names *jucunda* and *cinis*.

111. Syneda Edwardsii Behr, Trans. Am. Ent. Soc., 3, 28.

California, Mr. Hy. Edwards, No. 89. Two specimens.

112. Syneda ochracea Behr, Trans. Am. Ent. Soc., 3, 25.

California, Mr. Hy. Edwards, No. 1267.

113. Syneda socia Behr, Trans. Am. Ent. Soc., 3, 27.

California, Mr. Hy. Edwards, No. 52. One specimen from Santa Barbara.

114. Syneda Howlandii Grote, Proc. Ent. Soc. Phil., 3, 533, pl. 6, fig. 7.

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Mr. Edwards sends me a specimen of *Syneda Stretchii* Behr, from Nevada, which will, I think, prove identical with my previously described Coloradian species.

115. Syneda divergens Behr, Trans. Am. Ent. Soc., 3, 27.

Sierra Nevada, Mr. Hy. Edwards, No. 4307.

116. Syneda adumbrata Behr, Trans. Am. Ent. Soc., 3, 27.

Sierra Nevada, Mr. Hy. Edwards, No. 2262.

I do not think that either of these two latter species is the same as our Eastern *graphica*. *Divergens* is nearer to *hudsonica*. If the differences which separate these Californian forms are really of specific value, it may eventuate that the specimen figured as the ♀ *hudsonica* is a distinct species. Having only single specimens of the Californian species, and without my types of *hudsonica*, I cannot attempt to offer any conclusions.

117. Syneda Tejonica Behr, Trans. Am. Ent. Soc., 3, 26.

Fort Tejon (Behr.) Unknown to me.

118. Syneda nubicola Behr, Trans. Am. Ent. Soc., 3, 25.

Tuolumne River (Hoffman.) Unknown to me.

119. Syneda maculosa Behr, Trans. Am. Ent. Soc., 3, 26.

Tuolumne River (Behr.) Unknown to me. These two species may belong to a different genus.

120. Lita sexsignata Harvey, Bul. Buff. S. N. S., 2.

Nevada, Mr. Hy. Edwards, No. 5536; California, Mr. Crotch in Mus. Comp. Zoology, Cambridge.

Behrensia. N.g.

Allied to *Plusia*. The head is sunken; eyes naked, lashed; labial palpi with obtuse terminal article, second joint loosely haired. Maxillae stout. Collar produced in front so as to stand off from the prothorax. Thorax tufted behind, but apparently without the large dorsal tuft of *Plusia*. Abdomen with a fan-shaped mesial tuft, which is concave on the face, directed towards the abdominal tip; sides tufted; body pilose. Antennae pubescent, simple. Ornamentation resembling *Abrostola*.

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121. Behrensia conchiformis. N. s.

♂. Thorax and fore wings blackish gray. Median lines deep black, distinct, sinuous, geminate; a fine line precedes the t. a. and succeeds the t. p. line. T. a line with a costal tooth, rather deeply undulate. Median space much shaded with black, obscuring the rounded claviform. Orbicular large, round, whitish, with dark centre. A white shade obtains between the spots, extending below the median vein, and touches the large reniform, which has a dark central streak touched with green. Green and slightly orange scales are scattered along the subcostal vein, along the obsolete basal half line, beyond the t. p. line, and the scalloped terminal line is green, of the light hue of copperas. Subterminal line faint, pale. Hind wings pale in the disc, the pale portion neatly defined by a mesial black streak. Beneath the mesial black line is distinct and denticulate, and the white disc shows a black streak less noticeable above. A second, sub-basal line is costally visible. Fore wings show a black curved extra mesial line, else both wings are blackish gray. The body hairs beneath are tinged with reddish, as in some species of *Plusia*. *Expanse* 29 m. m.

Mr. Behrens, No. 226, California (Sauzalito).

The handsome species appears to me to differ generically from any of the forms included by Lederer in *Plusia*, by the obtuse, dependent third article of the loosely held, hanging palpi. The collar is unusually projected, without being broad. The head is more sunken than in any species of *Plusia* known to me. The base of the antennae are shielded by long hair tufts.

122. Graphiphora Behrensiana. N. s.

The eyes are hairy. The fore wings are coarsely irrorate with black, of a dull brown ground color, darker to the pale subterminal line, beyond which they are paler, with the veins pale marked. The costal edge is carneous. The lines are pale, tolerably approximate on internal margin, rather even, with blackish margins, the t. a. line outwardly oblique, the t. p. line flexuous. Ordinary spots large, pale margined, fused, so that there is a resemblance to some species of *Glaea*. Hind wings soiled white, sparsely irrorate, with a discal dot, concolorous fringes and a broken terminal line. Beneath whitish, a continuous line on primaries, dotted on the hind wings; discal marks double on fore wings; very distinct on secondaries. *Expanse* 35 m. m.

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Mr. Behrens, Sauzalito, No. 227.

ERRATA.—Page 27, for "*illaudibilis*" read "*illaudabilis.*" Page 28, dele "*atlantica, subjuncta,*" and insert "*mactata.*"

PARASITIC DIPTERA.

By the kindness of Baron Osten-Sacken, of Cambridge, Mass., we have been favored with the following notes :

Gaurax anchora Loew., Centur., vii, 94.

Numerous specimens of this insect have been bred by Baron Osten-Sacken from a cocoon of *S. cecropia.*

Blepharopeza adusta Loew., Cent., x, 67.

Examples of this species have been reared from the caterpillars of *Spilosoma acrea* by Mr. H. Edwards.

LOCAL LISTS OF BUTTERFLIES.

All our American readers who are collecting Diurnal Lepidoptera, in whatever part of the country they may reside, would confer a great favor on us by sending lists of the names of such species as are found in their neighborhoods, stating at the same time whether the species are abundant or otherwise. If a general response can be obtained to this request, we shall be able to present our readers with a tabulated list, showing more correctly and completely than has heretofore been known, the distribution of the various species of butterflies throughout America. Such information is very desirable, and would save those at present engaged in the study of this interesting family, as well as any who may hereafter enter on it, an immense amount of correspondence. Mr. W. H. Edwards, of Coalburgh, W. Va., has kindly undertaken to tabulate all the lists that may be sent in, and when completed, publish the material in our pages. We hope our friends will all aid in this desirable undertaking, and each contribute his mite, sending the lists as complete as possible. Lists will be acknowledged in the ENTOMOLOGIST in the order in which they are received.

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TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 56.)

DRYOPE.

D. luteopulvella. N. sp.

Pale yellow, sprinkled with pale fuscous. *Al. ex.* $\frac{7}{16}$ inch.

I have also taken it in Kentucky, and have received it from Miss Murtfeldt from St. Louis.

AETOLE, *gen. nov.*

Belongs to the Elachistidæ, but is quite distinct from any genus known to me, approaching perhaps as near to Heliozella as to any other.

Tongue long and naked; no maxillary palpi; labial palpi *very* short, drooping, the third joint pointed, about as long as the second; forehead wide, obtuse; face wide but little retreating; scales of the head appressed. Eyes moderate, scarcely visible in front; antennae about as long as the body, simple, rather thick, the basal joint short.

Primaries lanceolate, scarcely caudate, but with the apical part narrow and pointed; cell closed by a somewhat oblique discal nervure; the subcostal gives off two branches before the end of the cell, and attains the margin before the apex; the discal gives off two branches, the superior being furcate before the apex, with one of the branches to each margin; the median is furcate from the end of the cell, and the submedian not furcate at the base.

Secondaries narrowly lanceolate; costal vein very short; median distinct; cell unclosed; subcostal obsolete to the middle of the wing, thence furcate with one branch to the apex and the other to the dorsal margin, and there is an independent discal? branch to the dorsal margin.

A. bella. N. sp.

Head, thorax, base of primaries, with a short basal streak near the margin, and the antennae, are dark slate brown, iridescent or silvery according to the light. Primaries reddish orange, with the base and basal streak, on the fold, a spot before the middle of the dorsal margin, another

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a little further back near the costal margin, another on the dorsal margin about the middle, and a small costal one opposite to it, and a wide band around the apex of the ciliae, of the same iridescent brown with the head and thorax. Ciliae dark brown, of a different hue from the band at their base; this band and the costal and dorsal spots are margined by some deep maroon brown scales. Sides and under surface of the thorax reddish orange. Abdomen and legs of the same hue with the head and wing spots, and the metathoracic legs have a reddish orange patch on the anterior surface of the tibiae. *Al. ex.* ¼ inch. Season, August. A very pretty little species.

Perhaps I am wrong in placing Aetole among the Elachistidæ, as I am not certain that it does not more properly belong with Tinagma, Perittia, Douglasia, &c., which Mr. Stainton, in Ins. Brit., v. 3, has placed in the family Glyphipterygidæ. But neither in the brief accounts there given, nor in the figures can I discover any reason for separating these genera from Elachistidæ; nor, from the formation of such a heterogenous group as Mr. Stainton's Glyphipterygidæ seems to me to be, Acrolepia, Roslerstammia, Glyphipteryx and even Aechmia seem to me to belong as properly in Gelechidæ as Butalis does, and more properly than do either Pleurota or Harpella. On the other hand, Douglasia, Perittia and Tinagma might be placed in Elachistidæ with perhaps as much propriety as Heliodines, Bedellia, Chrysoclista or Asychna. As to some of these genera, as Tinagma, Perittia, Antispila, &c., it seems to me there is much force in the suggestion of Dr. Clemens in one of his letters, published by Mr. Stainton in his edition of the Clemens' Papers, to separate them from Glyphipterygidæ, and form, by their combination with some genera now included in Lyonetidæ, a new and more homogenous genus. As before hinted, Lyonetidæ does not seem to me to be a much more homogenous group than the Glyphipterygidæ.

But I do not pretend to criticise the work of much better Micro-Ledidopterists than I ever expect to be. These are simply my reflections on reading some of the writings of Mr. Stainton and Dr. Clemens, the only authorities within my reach. *Glyphipteryx impigritella* Clem., two, or at most, three species of Lyonetia, a few of Antispila and Butalis, are the only genera above named which are known to be represented in this country; and for the other genera above named I have no authority to consult but Mr. Stainton. *Aetole bella* resembles closely the European *Chrysoclista linecella.*

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GRACILARIA.

G. (Corisceum) quinquistrigella. N. sp.

Head, face and palpi white, except the outer surface of the tuft and an annulus about the middle of the third joint at its tip, which are grey brown. Primaries grey brown, margined all around by white, widely so on the dorsal margin, but confined to the extreme costa on the costal side, and about five short, oblique, white costal streaks in the apical part of the wing, some of them indistinct. *Al. ex.* $\frac{3}{16}$ inch.

NEPTICULA.

N. Belfragrella. N. sp.

Face pale yellowish; eye-caps white; antennae brown; thorax and primaries pale gray, darker towards the apex of the primaries, and with a fuscous spot at the apex. *Al. ex.* from 2½ to over three lines. Season, April.

COLEOPHORA.

C. bistrigella. N. sp.

Antennæ and palpi simple. The neuration is that of *C. anatipendla*, Ins. Brit., v. 3, except that in the secondaries the subcostal goes to the apex, with a branch to the dorsal margin; and the median is three branched, the last branch continued through the ccll, and its connection with the second branch is faint.

Pale sordid ochreous, with a slight reddish cast on the primaries; extreme costal margin white almost to the ciliae, and a white streak from the middle of the base almost to the dorsal ciliae; dorsal margin towards the base whitish, faintly tinged with ochreous; space between the veins in the apical part of the wing darker than the general hue. *Al. ex.* half inch.

C. argentialbella. N. sp.

Palpi and stalk of the antennae simple; basal joint of the antennae tufted.

Silvery white; apical part of the primaries *very* sparsely dusted with scattered dark brown scales. *Al. ex.* half inch. Season, June and July.

Four specimens, only one of which exhibits the dusting, and it also shows in some lights a very faint, pale golden tinge; possibly it ought to be considered specifically distinct, but I think not.

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ANNUAL MEETING OF THE LONDON BRANCH.

The annual meeting of the London Branch of the Entomological Society of Ontario was held at the residence of Mr. A. Puddicombe, on the 21st January, 1875.

The following officers were elected :

President, H. B. Bock ; Vice-President, G. Geddes ; Secretary-Treasurer, J. M. Denton ; Curator, C. Chapman ; Auditors, J. H. McMechan and J. Griffiths.

SYNOPSIS OF NEUROPTERA.

Dr. H. A. Hagen, of Cambridge, Mass., is working on a new and largely augmented edition of his Synopsis of the Pseudo-Neuroptera and Neuroptera of North America, and would like the co-operation of all those interested in this department of Entomology. Collectors having undetermined specimens would aid in this good work by forwarding them to Dr. H. A. Hagen, Museum Comparative Zoology, Cambridge, Mass., who will willingly name them ; the only privilege he claims is to retain for the Museum new, or rare species, which he would find necessary to describe.

CORRESPONDENCE.

ON CALOCAMPA.

DEAR SIR,—

In a paper published in the Annals of the Lyceum of New York, Mr. Morrison discusses my views on the relationship between the North American and European species of this genus. So far as they relate to the resemblance between the American *nupera* and the European *vetusta*, Mr. Morrison may be correct, and my later statement that the species cannot be regarded as "representative," incorrect. Mr. Morrison, however, charges me with saying that "*nupera* is more closely allied to *exoleta*" (i. e., than to *vestuta*), which I have never stated. I say in the

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Proc. of the Academy of Natural Sciences, that "*C. nupera* appears to me to resemble the European *C. exoleta*, rather than *C. curvimacula*, in opposition to Mr. Morrison's opinion on the subject." I intended to dissent from Mr. Morrison's assertion that *C. curvimacula* may stand for the American representative of *C. exoleta*, by showing that *C. nupera* was nearer *both* the European species than *C. curvimacula*. In regard to the position of *solidaginis*, I consider it the type of a distinct genus, following Hübner and Stephens. Guenée refers the species to *Cloantha*, Lederer to *Calocampa*. Now that we have a closely allied North American representative, and that Mr. Morrison himself gives us at least a single "material structural difference," I feel warranted in considering my adoption of *Lithomia* for *solidaginis* and *germana* authoritative and reasonable.

A. R. GROTE.

ON ADITA.

DEAR SIR,—

Mr. Morrison recently corrects my statement that the tibiae are spinose in this genus. Mr. Morrison says that "the only spines visible are the pair before the spurs on the middle tibiae and a single spine (there possibly may have been two) between the two pair of spurs on the hind tibiae." I have re-examined my specimen, and I find on the outside of the middle tibiae a series of eight spines in irregular pairs before the spur, besides several finer spines, and on the hind tibiae three spines are plainly visible. The spines frequently break off, as has been noticed by European Entomologists. Perfectly fresh specimens will probably show he presence of more spines on the hind tibiae. The fore tibiae are furnished with a stout, terminal claw.

A. R. GROTE.

In reply to Mr. Morrison's enquiry as to the propriety of retaining *Cirroedia* Guen. (1839) instead of *Atethmia* Hubn. (1816) for a genus of Noctuidae, I would state that I gave the subject careful consideration when preparing my "List." I was finally led to adopt the older name from the following considerations. Dr. Herrich-Schaeffer (Corr.-Bl., 75) remarks that he doubts the validity of Guenée's genus *Atethmia* for the South American species. The point is here as to *subusta*, of which Mr. Morrison says that it is "South American," as if he were giving a structural character. Again, Atethmia is dated 1816, and although Hübner

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adds a species "*subusta*" to the genus, such a species was not then published. Hübner's *Atethmia subusta* is given later, in 1823, in his Zutraege, under the numbers 205, 206. Now, Hübner cites in the Verzeichniss "105—106." Perhaps he had intended a different and earlier publication of *subusta* than that which was ultimately carried out. There is also some evidence that Hübner considered the European, and not the South American species as typical of the genus *Atethmia*, to be gathered from the text of the Zutraege itself.

Again, Mr. Morrison says that Gueneé "takes out" of Hübner's genus the European *Xerampelina*. Gueneé, however, in his Essai takes no cognizance whatever of Hübner's generic reference of his species. Gueneé says of *Xerampelina*: L'unique espéce qui compose ce genre a été placée *jusqu'ici* dans les Xanthies. Again, Guenée in his "Speciés General" does not, as Mr. Morrison states, refer *subusta* as the typical species of Hübner's genus. Gueneé there does not know *subusta* at all, and says of the genus: "Ce petit genre, dont je n'ai emprunté a Hübner *que le nom*, puis que dans son Verzeichniss, il se compose principalement (!) de *mes* Cirroedia," etc.

The question is one to which I had devoted considerable study, and in a more general List of our moths, upon which I am engaged, I expect to have occasion to note further evidence as to the use of *Atethmia* in European works for *Xerampelina*. I shall be glad always to note corrections to my List, which deviates so greatly from its predecessors that it should not be expected to be everywhere exhaustively correct. And although Mr. Morrison may not always be able "to see the necessity of this change," yet he will find that no generic title is there adopted without a reason.

A. R. GROTE.

DEAR SIR,—

Mr. Grote's letters in your last issue seem to contain, in the main, the reasons why he made certain errors in regard to my work, and a repetition of his former statement, to the effect that I had made five synonyms in one of my papers containing descriptions of about sixty species; the former statement does not call for any word from me, but perhaps it would not be out of the way (since we are on the subject of re-descriptions of old species) to ask why Mr. Grote has re-described within six months the common *Agrotis incivis* Guen. as a new genus and species, under the title of *Anicla Alabamæ*; or why the well-known *Orthosia ferruginoides*

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Guen. is re-described as *Xanthia ralla* G. & R. ; or *Acronycta brumosa* Guen. and *innotata* Guen. as *A. verrilli* G. & R. and *Diphthera graefii* Grote ; or *Celiptera frustulum* Guen. as a new genus and species, *Litomitus elongatus* Grote ; or *Plusia ou* Guen. as *Plusia fratella* Grote; or —but we say no more. It is only human for the best of naturalists to make mistakes occasionally.

In regard to the latter statement of Mr. Grote, it is perhaps unnecessary to repeat again that of the five species of mine which Mr. Grote considers as synonyms, three were published in papers contemporaneous with mine, having priority by one day, and which I could not have foreseen; one was published on the authority of Mr. Grote himself (*Mamestra illabefacta*), and the other (*Hadena rasilis*) is not a synonym, but a distinct species, and Mr. Grote is in error in considering it identical with *Elaphria grata* Hübn.

In ignoring Mr. Grote's genera *Eucoptocnemis*, *Exyra* and others, I simply follow the example of Dr. Speyer and the best European authorities in not recognizing catalogue names unaccompanied by a generic description.

With regard to Mr. Grote's remarks on my genus *Eutricopis*, I consider *Tricopis* (which, by the way, is a synonym of *Euleucyptera*, founded by the same author) as a generic term covering all the characters of the insect or group of insects which it was founded to contain; the three-clawed tibiæ is but one of many characters. Therefore, when I discovered a genus which approached *Tricopis* in many of its characters, but was sufficiently distinct from it, I very properly gave it the name of *Eutricopis*.

Mr. Grote does not agree with me when I unite *Bolina nigrescens* G. & R. with *fasciolaris* Hübn. *Bolina fasciolaris* is a very common and variable species ; I have examined a large series, among which many agree with Grote and Robinson's excellent figure, and as they are from the same locality, Texas, I have no doubt that it is their species which I have identified. I have also carefully examined several copies of Hübner's figures, and am confident that the two species are identical.

Mr. Grote closes with some remarks in regard to his "List," the great value of which I cheerfully acknowledge ; however, it is open to criticism in many particulars ; for instance, the omission of several of M. Guenee's species, one of the omitted species being described by Mr. Grote under a different name, and is in addition placed in a genus to which it by no means belongs. I also object to the admission at present of the genus

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Ammoconia to our fauna. *A. badicollis* Grote, referred to that genus in the List, is a true *Agrotis*. I have examined the two European species of this genus, and am satisfied that it can not be retained there.

I remain yours truly,

—— H. K. MORRISON.

Dr. Harris, writing to Hentr. (Harr. Cor., p. 11), says: "Have you ever seen a *Rhagium*? . In January I obtained from beneath the bark of a tree nearly twenty males and females of *R. lineatum* Oliver."

My object in writing is to ask your readers if they have ever found *R. lineatum at such a time of the year and in such a situation.* In the summer of 1873 (being absent from home I cannot give the exact dates but probably in May or June) I spent a week in Baltimore, Md., and every morning captured several examples of this species on the walls of a church—none elsewhere. I learned from Mr. Baumhauer, of that city, that he also had taken the same species at the same place several year, in succession. W. V. ANDREWS, New York.

RARE CAPTURES.

On the 15th Sept., as my brother and myself were returning from an Entomological foray, I saw something like a flash of orange light flit past me, and turning, I saw an insect which I did not know was found here, viz., *Colias eurytheme.* Away it was flying like a ray of sunlight, flitting from flower to flower, resting only for about the smallest conceivable portion of time, and it was only after a long and exciting chase that I managed to capture my prize. It was in beautiful condition, apparently just fresh from chrysalis, and I consider myself very lucky in obtaining it.

Among our rarities, I would also mention a very fine specimen of *Smerinthus modesta* which I obtained from a friend who found it clinging to the eaves of his cottage. We have also among our Catocalidæ, a specimen of *C. concumbens* with abdomen of a bright pink on the upper surface, closely resembling the European *C. pacta* in this respect, only the color is not quite so vivid. C. W. PEARSON, Montreal.

CORRECTIONS.—Gaspé is on the *south* shore of the St. Lawrence, opposite Anticosti. In my note on p. 18 regarding *P. brevicauda*, you make it north. Also, Mr. Edward's name should have been inserted as the writer of the leading quotation in the article on *Glaucopsyche Couperi*. —WM. COUPER, 67 Bonaventure St., Montreal.

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The Canadian Entomologist.

VOL. VII. LONDON, ONT., MAY, 1875. No. 5

SOME NOTES ON LYCÆNA PSEUDARGIOLUS.

BY W. H. EDWARDS, COALBURGH, W. VA.

In September, 1873, Mr. T. L. Mead, who was then at Coalburgh, observed a ♀ *pseudargiolus* depositing eggs upon the flowers of *Actinomeris squarrosa*, and on examining the flower heads found a number of eggs. He brought home two of the females, and enclosed them in a muslin bag upon the flower heads of the same plant, near my house, the plant being not at all an uncommon one here. Several eggs were soon deposited, and in due time the larvæ were hatched and some of them were carried through to chrysalids, a change which occurred about the middle of October. The flowers of *squarrosa* becoming scarce before the caterpillars were mature, I tried the flowers of an allied plant, *A. helianthoides*, and found them to answer equally well. The eggs are laid singly on the still undeveloped flower, and the larva feeds on the petals or eats its way to the seed vessel. In no instance have I seen it feed upon the leaf of the plant. The chrysalids of this lot were found to be dead in the spring of 1874.

In September, 1874, I noticed the females of same species hovering about *squarrosa*, and confining some of them as before, obtained eggs, and three of the larvæ from these I succeeded in bringing to chrysalis. Late in the winter the chrysalids were placed in the greenhouse, and on the 13th of Feb'y, 1875, there emerged from them three true *violacea*, 1 ♂, 2 ♀. This unexpected result shows *violacea* to be the spring form of *pseudargiolus*. *Violacea* never appears here after the last of April or the first few days of May. If the weather is pleasant through April, it is extremely abundant from the first to the middle of the month. The first *violacea* which appear come in the warm days of March, so that their entire period in the imago is not far from six weeks, and after that no more are seen till the following spring. On the other hand, *pseudargiolus* appears from the 10th of May to the 1st of June; about the 1st of July there is a second brood, and one or two others during the summer.

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In the light of this discovered relationship, it becomes a question as to *neglecta* and *lucia*. I am prepared to believe that *neglecta* may prove to be one of the summer broods of *pseudargiolus* in this latitude, but the point can only be determined by breeding from the egg. There are differences between the two forms sufficient to make me regard them as distinct till the contrary is proved. Moreover, Mr. Saunders found the larva of *neglecta* feeding on *leaves of cornus*, and the description of it published by him in v. 1, p. 100, CAN. ENT., does not at all agree with the larva of *pseudargiolus*. Mr. Mead has lately written me that the larvae of *neglecta* were found by him last year at Ithaca, N. Y., on flowers of *Ceanothus Americanus*—New Jersey Tea—but he does not appear to have written a description of them. We may hope that the coming season will settle the question of relationship in these cases. It may be inferred, inasmuch as *lucia* also is an early spring form (or, at least, I cannot learn that it appears at any other time than in late spring or early summer, which would correspond in New York to April and May here) that it is the spring form of the northern *neglecta*, which appears in the Catskills in June and at intervals till September.

I have a full series of drawings by Miss Peart, of the egg, several stages of the larva, and the chrysalis of *pseudargiolus*, and when I have obtained a like series of *neglecta*, I will devote a plate to them in the Butterflies of N. A.

As the plants on which the larvae were found here bloom only in the fall, the larvae of *violacea* and of the earlier broods of *pseudargiolus*, if they feed only upon flowers, must live upon a variety of plants.

NOTE.—After the foregoing lines were in type, Mr. Scudder wrote me that in Mass. "*neglecta*, *lucia* and *violacea* all appear in May," the inference being that one could not be the parent of another. I cannot but think that there is a mistake here, although Mr. Scudder's accuracy is well known. At Newburgh, N. Y., I always counted on taking *lucia* on the catkins of certain species of willow, and this was in May. But I have no mention in my diary of ever seeing *neglecta* before June. I wish that collectors interested in the subject would observe the times of first appearance of each of these species this season, and favor me with their observations through the ENTOMOLOGIST.

[Our own experience is rather adverse to the theory advanced by our esteemed friend Edwards, as to the identity of *neglecta* and *lucia*. We have never taken a single specimen of *lucia* in this neighborhood (Lon-

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don, Ont.,) and do not know of any one who has, and we question if any district of our province has been more thoroughly worked up. *Neglecta*, although not very common, is taken every season here, the first brood usually occurring during the latter part of May and the early days of June, and the second brood in July and later. On looking over some old memoranda, we find the following dates of captures of *neglecta*: 1861, one specimen taken May 22nd, one on the 25th, one on the 30th, and one on the 4th of June. In 1862, two specimens on the 14th and one on the 15th of May. In 1863, two on the 19th and one on the 22nd of May, and in 1865, one on the 30th of May, one on the 4th of June, and a specimen much beaten on the 25th of the same month. On the 2nd of July a fresh looking specimen was taken, and on the 5th another, both probably belonging to the second brood. The larvae of *neglecta*, described in the paper referred to by Mr. Edwards, were taken nearly full grown on the 12th of July, feeding on a species of *cornus* (they were subsequently fed on willow); five of them produced the imago shortly after, and they were all well defined specimens of *neglecta*.—ED. C. E.]

ON THREE NEW SPECIES OF NOCTUIDÆ.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

Agrotis rufipennis. N. sp.

♂. Eyes naked, all the tibiae spinose, antennae brush-like. Thorax, head and appendages brownish red. Anterior wings brownish red, silky. Median lines faint, blackish, tolerably approximate. T. a. line nearly straight, t. p. line evenly rounded, tending to be obsolete on the veins; costal dots mark the inception of the lines. Median shade very faint. Stigmata obsolete; there is merely an indication of the reniform. Subterminal line pale, narrow, continuous; terminal space darker than the wing, the fringes lighter. Hind wings pure white, immaculate. Abdomen pale. Beneath primaries powdered with reddish, secondaries white with powdery reddish scales along costal region. No perceivable lines or dots in the type. *Expanse* 38 m. m. *Hab.* New York (Lintner). The insect looks something like a *Ceramica*.

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Orthosia helva. N. sp.

♂, ♀. A large and common species from the Eastern slope, of which I have seen many specimens. It is possibly not described here for the first time, but I can find no name for it. The eyes are naked, with lashes; tibiae unarmed; abdomen conical. The size is large, Hadena-like. Fore wings dark yellow, with the lines reddish brown, obsoletely and widely geminate, distinct; t. a. waved, inner line incomplete. Orbicular concolorous, brown ringed, sub-ovate; reniform large, illy defined with a prominent inferior blackish stain; median shade well marked, nervulous. T. p. line with the inner line fine, dentate, the outer line continued as a series of black nervular points. Subterminal line broken, with a darker costal preceding shade. Fringes darker than the wing, cut with pale. Hind wings fuscous, with yellow fringes. Abdomen mostly dark yellow, with plumose side and anal tufts in the ♂, and with a feeble basal tuft. *Expanse* 40 m. m.

I refer this species to *Orthosia* rather than *Hadena*, from the lashed eyes. It is larger than, but resembles *O. ferrugineoides.*

Glæa venustula. N. sp.

A species distinguishable by the nervules, vein 1, and the median vein being finely and continuously marked with pale. The color is a light drab brown, costal and internal edges of the primaries and the edges of the collar pale. Transverse lines pale; t. a. line rounded with a dark succeeding shade. Stigmata concolorous, distinctly pale ringed; orbicular oblique, irregular, narrowed; reniform somewhat pyriform, narrowing inferiorly; s. t. line of the usual shape, pale, with preceding dark shade, distinct. Terminal line black, incomplete; fringes concolorous. Hind wings blackish fuscous, with ruddy fringes. Beneath pale reddish, fuscous on the disc of primaries; hind wings feebly irrorate, with a line and discal spot. *Expanse* 42 m. m. *Hab.* Maryland (Lintner).

The genera *Orthosia* and *Glæa (=Cerastis)* are regarded as nearly allied by Lederer and Herrich-Schaeffer. My *Glæa apiata* is cited as "*Orthosia ? apiata*" by Mr. Morrison (this vol., p. 16); the exclamation mark is superfluous, as I had already correctly referred the moth, and the latest work of an author, replacing a former one, is the one to be criticized. Mr. Morrison says of the species of *Glæa*, that the claviform spot "seems to be nearly always (?) present in this genus, although not mentioned in Mr. Grote's descriptions." As constituted by myself (Bul.

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B. S. N. S., 2, 125), the genus in America is composed of *viatica* Grote, *decliva* Grote, *inulta* Grote, *apiata* Grote, and *olivata* Harvey. In none of the specimens of these species before me is there the faintest trace of the claviform. I do not know Mr. Morrison's new species, *sericea* and *pastillicans*. There is no trace of the spot in the more recently described *tremula* Harvey, from Texas. The tendency, however, throughout the Noctuidæ is to reproduce the normal ornamentation, and it is possible that certain specimens may show traces of a spot usually absent in the species to which they belong. Such cases authorize no stricture upon original descriptions of species based on specimens which do not exhibit the character.

ON SOME OF OUR COMMON INSECTS.

THE BEAUTIFUL DEIOPEIA—Deiopeia bella.

BY THE EDITOR.

This lovely moth, represented in fig. 11 (after Riley) may well claim a place among the most elegant and beautiful of the Lepidoptera. Although rare in some parts of our province, they are quite common in other localities. We have found them common in the neighborhood of Port Stanley, on the shores of Lake Erie, and they are usually common and sometimes abundant about Grimsby, Ont. We have also seen them in other collections from various parts of Canada.

Fig. 11.

This moth measures when its wings are expanded about one and a half inches. Its fore wings vary in color from lemon yellow to orange, and are crossed by six white bands, each containing a row of black dots. The hind wings vary in color from pink to scarlet red, with an irregular border of black behind. The fringes of the wings are white.

The under surface of both pairs of wings is of a deep red color, with the front edge of the fore wings yellowish; the white bands on the upper

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surface of the fore wings are not reproduced, but the black dots are more prominent, and being more or less confluent, appear as broken bands. The hind wings are marked nearly as above.

The head is white, spotted with black; the shoulder covers white, with some yellow at the base, and two black dots on each; the thorax and abdomen whitish, the former with six black dots, the latter banded with black beneath.

LIST OF DIURNAL LEPIDOPTERA OF THE ISLAND OF MONTREAL, P. Q.

BY F. B. CAULFIELD, MONTREAL, P. Q.

PAPILIONIDÆ.

1. Papilio asterias Drury.

Not common in the vicinity of the city; more abundant in the open country. May to end of August.

2. Papilio turnus Linn.

Generally common; end of May to middle of July.

PIERIDÆ.

3. Pieris oleracea Harris.

Not common; May and June. I have not seen an August brood.

4. Pieris rapæ Linn.

Very common, although not so extremely abundant as a few years ago, owing to the attacks of *Pteromalus puparum*. May to end of September. Var. novanglia Scudd., not common, but appears throughout the season.

5. Colias eurytheme Boisd.

Very rare; a male in fine condition taken last season (1874) by Mr. C. W. Pearson.

6. Colias philodice Godart.

Generally abundant; last season very scarce; June to October; white females very rare; August.

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DANAIDÆ.

7. Danais archippus Cram.

Generally common; some years very scarce; May to end of Sept.

NYMPHALIDÆ.

8. Argynnis cybele Fabr.

Common; end of June to middle of August.

9. Argynnis aphrodite Fabr.

Not so common as last species; end of June to middle of August.

10. Argynnis atlantis Edwards.

Very rare; I took one example in 1872.

11. Argynnis myrina Cram.

Very common in damp meadows; May, June and August.

12. Melitea phaeton Drury.

Rare; June.

13. Phyciodes Harrisii Scud.

Very rare; taken by Mr. P. Knetzing.

14. Phyciodes nycteis Doubld.

Rare; July.

15. Phyciodes tharos Boisd. & Lec.

Very common; June to middle of August.

16. Grapta interrogationis Fabr.

Rare; May (hybernated); July to October.

17. Grapta comma Harris.

Common; May (hybernated) end of June to October; var. dryas Edwards not so common.

18. Grapta faunus Edwards.

Generally scarce; last season (1874) very abundant. May (hybernated) July to October.

19. Grapta progne Cram.

Common; May (hybernated) July to October.

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20. Vanessa antiopa Linn.

Very common; end of April and May (hybernated), July to October Var. Lintnerii, bred by Mr. Pearson last season.

21. Vanessa milberti Godart.

Not common, being greatly checked by parasites in this locality. I collected over thirty larvæ last season (1874), but only got four butterflies, the remainder being full of small ichneumons. May (hybernated) August and September.

22. Vanessa J-Album Boisd. & Lec.

Not common; end of April and May (hybernated) July to October.

23. Pyrameis huntera Drury.

Generally scarce; August and September. I have not seen hybernated specimens.

24. Pyrameis cardui Linn.

Some years scarce, others common; very abundant last season (1874.) May and June (hybernated) August and September.

25. Pyrameis atalanta Linn.

Not common; May (hybernated) end of July to October.

26. Limenitis arthemis Drury.

Not abundant; July and beginning of August.

27. Limenitis disippus Godart.

Common; June to end of August.

SATYRIDAE.

28. Euptychia eurytus Fabr.

Common in open woods; June.

29. Satyrus nephele Kirby.

Not common; open fields; July and August.

30. Lethe portlandia Fabr.

Not common; July.

31. Pararge Boisduvallii Harris.

Abundant in open grassy swamps; end of June to middle of August.

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LYCAENIDAE.

32. Thecla calanus Hübn.

Generally rare ; abundant last season (1874) on blossoms of Asclepias and Sumac ; July and August.

33. Thecla mopsus Hübn.

Rare ; July and August.

34. Thecla niphon Hübn.

Very rare ; taken by Mr. P. Knetzing.

35. Chrysophanus Americana Harris.

Generally common ; May, June, August and September.

36. Chrysophanus hyllus Cram.

Thoe Boisd. ; very rare. I took three specimens at Lachine in Aug., 1872, and have not met with it since.

37. Lycaena comyntas Godart.

Rare ; June, July and August.

38. Lycaena lucia Kirby.

Very common ; May and June.

HESPERIDAE.

39. Epargyreus tityrus Fabr.

Common ; June and July.

40. Thorybes pylades Scudder.

Bathyllus Harris ; common ; end of May, June and July.

41. Nisoniades brizo Boisd.

Rare ; June.

42. Atrytone hobomok Harris.

Very common ; June. *Pocahontas* ♀ var. Scudder not common.

43. Anthomaster Leonardus Harris.

Very rare ; one specimen taken in 1872.

44. Polites peckius Kirby.

Wamsutta Harris ; not common ; July.

45. Hedone orono Scudder.

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Not common; July.

46. Limochores mystic Scudder.

Not common; July.

47. Limochores taumas Fabr.

Ahaton Harris; Very common; end of June and July.

These are all the species that I have seen from this locality *Pieris protodice* was taken at Lachine some years ago by Dr. Barnston. *Argynnis bellona* was taken last season (1874) by Mr. R. Jack, on the south shore of the St. Lawrence, opposite Lachine, and probably will yet be found on the Island of Montreal, and I think additions will be made to the Lycænidæ and Hesperidæ when these groups have been properly worked up.

I have, with two or three exceptions, followed Mr. W. H. Edwards's synopsis in this list, both in classification and nomenclature.

I hope to soon give lists of the remaining families, and would here gratefully acknowledge the assistance given me by those friends who kindly allowed me to study and refer to their material, amongst whom I would especially mention Messrs. Wm. Couper, P. Knetzing, C. W. and G. B. Pearson.

DESCRIPTION OF A NEW NORTH AMERICAN SPECIES OF MAMESTRA, AND OF A GENUS ALLIED TO HOMOHADENA.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Mamestra dodgei. Nov. sp.

Expanse 34 m. m. Length of body 14 m. m. Eyes hairy; antennae of the male simple; villosity of the palpi coarse; thorax provided with the usual fore and hind tufts; abdomen short, stout and untufted; ground color of the anterior wings gray, without ochreous or brown admixture, as in *M. lorea* Guen.; the ordinary spots are tolerably distinct, concolorous, black encircled, the reniform filled below with black, the claviform small; the median lines are simple, black and conspicuous, the interior line perpendicular, forming a triangular projection above the orbicular spot,

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which it touches; below it is lobate; the exterior line is even and non-denticulate; it is incepted at about the middle of the costa, strongly produced around the reniform spot, and below it extends obliquely, reaching the inner margin very close to the interior line; the median shade is indistinctly seen below the reniform spot; the subterminal line is diffuse and undulate; a black line at the base of the dark fringe.

Posterior wings blackish, with a light fringe; traces of the discal dots and median lines.

Beneath the wings are yellowish gray, with a very distinct undulate common median line; discal dots small; the base and median portions of the anterior wings blackish.

Hab. Nebraska (G. M. Dodge.)

This species is closely allied to our common *M. lorea*, which also occurs in Nebraska; the differences will be readily seen from the description.

I dedicate this insect to my friend Mr. G. M. Dodge, already well known by his interesting contributions to this magazine.

Copihadena. Nov. genus.

Under this name I separate from allied genera a little Texan species which has just been described by Dr. Harvey, of Buffalo, as *Homohadena atricollaris.* The species cannot be referred to *Homohadena* on account of the slender claw at the extremity of the anterior tibia, and which seems to have been overlooked at the time of description. This new genus is quite remote from the few other genera of Noctuidæ which possess the above important structure, as *Dicopis*, *Copipanolis* and *Adita*; it is perhaps nearest to *Oncocnemis*, but the eyes have not distinct hairy lashes and the ornamentation is entirely different. It differs from *Homohadena*, besides the tibial claw, by the slender thorax and elongate wings; however, the ornamentation is very similar in the two genera. *Homohadena induta* Harvey, described at the same time as *H. atricollaris*, is identical with *Homohadena retroversa* Morr., from Missouri. Many of the species which are found in Missouri, Kansas and Nebraska also extend down into Texas.

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TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 75.)

ŒCOPHORA.

Œ. basquecella.

Palpi dark brown, with a yellowish white annulus around the middle and tip of the second and third joints. Head yellowish white; antennæ dark brown, with the extreme tip of the basal joint white. Thorax above and base of the forewings brown; dorsal margin of the forewings, from the base to the ciliae, pale orange yellow, with a broad fascia of the same hue at about the basal fourth, passing across the wing and gradually narrowing to the costa. Behind this fascia to the apex the wing is brown, containing an irregular yellowish spot at about the middle of the costal margin, and a white one immediately before the ciliae. The brown color has a rich maroon tint, and not a dead lustreless hue. Legs and tarsi brown, annulate with pale yellowish. Venter brown, with two yellowish bands before the apex. *Al. ex.* ½ inch. Basque Co.

GRACILARIA.

G. belfragecella. N. sp.

Antennae purple brown; face and palpi white, the second joint of the maxillary palpi being tipped beneath its apex with purple brown; thorax and wings purple brown. The costal triangle is pale lemon yellow (nearly white), reaches the fold, where it is truncated, and it extends as a wide band along the costal margin to the ciliae. Sides of the thorax pnrple brown; anterior and middle legs purple brown, with white tarsi; hind legs whitish, except the apical halves of the femora, which are purple brown. *Al. ex.* 1/6 inch.

THEISOA.

It is possible that this genus ought not to have been separated from *Elachista.* Its more elongate palpi, the horizontal position in repose of the wings, and the dissimilarity of ornamentation of the wing from that of other species of *Elachista,* induced me to separate *T. bifasciella* from

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that genus, and make it the type of this. *Bifasciella* is not a very appropriate name for that species, since it is seldom that the second fascia can properly be called a fascia at all; usually it is only indicated by a slightly paler shade of the yellowish brown color of that part of the wing between the small white costal and dorsal streaks at the beginning of the ciliae, and sometimes these streaks are not at all distinct. The specimens from Texas do not differ from those taken in Kentucky. The species described below does not differ structurally from *T. bifasciella*, but its ornamentation is very different both from it and from all species of *Elachista* known to me, whilst it is almost exactly that of a species described by me in the *Cincinnatti Quar. Jour. Science, v. 2*, under the specific name of *fasciella*, as the type of a new genus, *Æsyle*. *A. fasciella*, however, is structurally quite distinct from *Theisoa*, and approaches much more closely to *Lithocolletis*, from which I separate it with hesitation.

T. multifasciella. N. sp.

Head brownish yellow, becoming paler on the face around the mouth. Palpi externally brown, internal surface white. Antennae alternately brown and silvery white. Upper surface of the thorax and base of the forewings brownish red. The forewings are banded with alternate wide fasciae of white and brownish red, the brownish red fasciæ being margined rather narrowly behind with dark brown. Including the brownish red on the base of the wings, there are four fasciæ of that hue and three white ones and the tip of the wing is also white. Hind wings and ciliae of the forewings pale grayish fuscous. Abdomen brown, the tip and posterior margin of each segment being white. Under surface of the forewings dull brown, that of the hind wings shining grayish fuscous. Legs and tarsi with alternate annulations of white and shining dark brown. *Al. ex.* $\frac{5}{16}$ inch.

ELACHISTA.

E. inornatella. N. sp.

Dark brown, immaculate, in some lights showing a faint purplish gloss. *Al. ex.* ¼ inch.

ITHOME, *gen. nov.*

This genus is allied to *Elachista*, *Chrysoclista*, *Laverna*, *Chauliodus* and *Perimede*.

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The palpi are long, slender and (in the dead insect) drooping and slightly divergent, resembling those of *Chrysoclista*, but more slender and the joints more nearly of the same size; the third joint is longer than the second. Tongue moderate, scaled. Face full, convex, nearly as wide as long; head and face smooth, with scales appressed; eyes globose, of medium size; antennae about two-thirds as long as the wings, with the basal joint a little elongate.

Fore wings lanceolate; the costal vein reaches the margin before the middle; the cell is acutely closed; the subcostal vein sends three branches to the costal margin, the first being emitted just behind the middle, and the third at the end of the cell, and the second nearer to the third than to the first; the median vein divides into three branches, the first of which is opposite to the second subcostal, and the third is at the end of the cell, and between it and the third subcostal branch is a discal? branch which is furcate before the apex, with a branch to each margin near the apex; the submedian vein is furcate at the base, and reaches the dorsal margin opposite to the first branch of the median.

Hind wings almost linear; costal vein very short; subcostal straight to the apex; cell unclosed; the median divides into three equidistant branches, the second of which attains the dorsal margin about the middle, and there is an independent? discal branch, which arises at the median and goes to the dorsal margin.

I. unimaculella. N. sp.

Palpi white on the upper surface, dark brown beneath, and with about three microscopic whitish specks on the under side of the third joint; tongue and face silvery white; antennae, vertex, thorax and forewings dark purplish brown; there is a small yellowish costal spot immediately before the ciliae, but the forewings are otherwise immaculate. Anterior and middle legs and tarsi brown, the tarsi annulate with whitish; hind legs and under surface of the body yellowish silvery. *Al. ex.* ¼ inch.

At a hasty glance this species and *Eriphia concolorella* and *Elachista concolorella* may be mistaken for each other. But the more elongate palpi, narrower wings, finer scales and costal spot, as well as the white upper surface of the palpi, sufficiently distinguish this species. The other two species differ very slightly in shade of color, but may be distinguished by the structure of the palpi, those of *Eriphia concolorella* being more elongate than those of the *Elachista*. All three are obscure, plain species.

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COLEOPHORA.

C. albacostella. N. sp.

Second joint of the palpi with a minute projecting tuft beneath its apex. Basal joint of the antennæ a little swollen. The head is tinged with ochreous, as also are the wings, though more faintly so ; the wings are somewhat dusted with fuscous, especially towards the apex. Extreme costa from the base to the ciliae white. *Al. ex.* a little over ½ inch.

C. trilineella. N. sp.

Antennae and palpi simple ; upper surface of the thorax white, the lower surface and legs tinged with yellow. Fore wings white, with a pale golden or ochreous line beneath the fold, close to and parallel with it ; a darker, but not more distinct line, parallel to the costa and close to it ; a more distinct ochreous line extends from the base to the apex, sending off in the apical part of the wing two branches to the costal ciliae. *Al. ex.* ½ inch.

OBITUARY.

[FROM THE AMERICAN JOURNAL OF NUMISMATICS, APRIL, 1875, VOL. IX, NO. 4, PAGE 95.]

" Mr. Philip L. Sprague, a resident member of the Boston Numismatic Society, died at Montpelier, Vt., his native place, on the sixth day of August last, in the forty-fifth year of his age. We have received from an intimate friend of his the following notice of our late member :—

" ' About 1862 he commenced the study of Entomology with me in the State Cabinet of Natural History, displaying a marked taste for the Lepidoptera, and during the intervals of his business made considerable progress in biological investigations, as well as in the technology of the science. Circumstances soon induced him to direct his attention chiefly to the Coleoptera, and here his assiduity in making collections, his accuracy in the determination of species, and his studies in the microscopic anatomy of this order, gave his opinions weight among naturalists. His keen appreciation of the labors of his predecessors, and his love of neatness and method evinced themselves in all he did.

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" 'At the time of his death he had been for some months a valuable assistant and member of the Boston Society of Natural History, where many of his works remain to speak for themselves. Among his associates there he was distinguished for his geniality of manner and never-failing readiness to assist younger students. At the time of his death his fame and foreign correspondence were somewhat extended, and he was actively engaged in the preparation of materials for an illustrative cabinet of the Natural History of his native State. He had published from time to time in the CANADIAN ENTOMOLOGIST and the Proceedings of the Natural History Society carefully elaborated results of his work, and contributed to various other periodicals devoted to his favorite branch of investigation. His fine private cabinet of insects, principally of the Coleopterous Order, in accordance with his expressed determination, form a part of the Museum of the Society to which he was attached, and is in itself no mean monument to his memory.' F. G. S.

" Mr. Sprague was elected a member of this Society May 5th, 1860."

CORRESPONDENCE.

RHAGIUM LINEATUM.

DEAR SIR,—

In reply to Mr. W. V. Andrews' enquiry, I would say that the above insect breeds under the bark of pine stumps. I have good reasons for thinking that it completes its transformations in September and hybernates until tbe following spring. I had long expected such to be the case from finding it in February and March, both living and dead, in the cavity formed by the larva in which to pupate. But in September, 1874, I found numerous specimens of the beetle that had just appeared, many of them not mature in color, and with them several specimens of the pupæ.

H. L. MOODY, Malden, Mass.

DEAR SIR,—

Mr. Andrews inquires, page 80, about *Rhagium lineatum* Oliv. The habits of this common species are well known to collectors of Coleoptera. Harris says, Ins. Inj. to Veg., p. 116: " These grubs (larvæ of *Rhagium*) live between the bark and the wood (of pines) often in great numbers together, and when they are about to become pupæ, each one surrounds itself with an oval ring of woody fibres, within which it undergoes its

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transformation. The beetle is mature before winter, but does not leave the tree until spring." I can personally vouch for the accuracy of the above, having often uncovered the beetle both in the fall and winter, as well as in the spring. It is ready to fly upon the advent of warm weather, and there were unquestionably other individuals about besides those observed on the church walls. This species, curious in other respects, furnishes also in its habits of hybernating a rather remarkable exception to the general rule among the Cerambycidæ. Most species of this family in this latitude pass the winter in the larval stage. During many successive winters' collecting I have met with no other species in its mature form. Several years since a living specimen of *Microclytus gazellula* Hald. was dug out of the bark of a living white oak, quite late in October, where it would doubtless have passed the winter months. Mr. E. P. Austin tells me, in a letter written at the time, of finding a specimen of *Graphisurus pusillus* Kirby, I think it proved to be, while sifting leaves in the winter of '73—'74. The only other instance which I now remember of the occurrence of a Cerambycide in winter is given by H. F. Fay, of Columbus, Ohio, in the Proc. Ent. Soc. of Phil., 1, p. 198, in an article on "Winter Collecting." He says: "The only Longicorn I have met with is a single specimen of *Cyrtophorus niger* Lec., or a var. of *Clytus albofasciatus* Grey."——"It was found"——"in the soft wood of a decaying elm."

F. PLANCHARD, Lowell, Mass.

DEAR SIR,—

In answer to Mr. Andrews' enquiry about *Rhagium lineatum*, in CAN. ENT., No. 4, I will say that I have found thousands under the bark of pine logs during the fall and at various times until the early summer months. The larva, pupa and imago are frequently found all at one time and under the bark of the same log, and I have at this time a bottle of specimens gathered in November from under the bark of a Jersey pine log not twenty miles from Mr. Andrews' residence.

A. S. FULLER, Ridgewood, Bergen Co., N. J.

ON THE USE OF CYANIDE OF POTASSIUM.

We have been favored with a letter from Mr. J. E. Chase, of Holyoke, Mass., in reference to the use of bottles containing Cyanide of Potassium for catching and killing moths. Mr. C. encloses a specimen label such as

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he attaches to bottles and distributes among those of his friends who are disposed to help him in making captures. We append this for the benefit of our readers:

POISON.

DIRECTIONS HOW TO CATCH MOTHS, ETC.—The contents of the bottles are prepared by dissolving Cyanide of Potassium in water, and pouring into the bottle to the depth of half an inch; then drop in Plaster-Paris until it thickens, and let it stand until hardened, keeping it CORKED. To catch moths with it, the best way is to take sugar from a molasses hogshead and mix with water, making it thick; spread this mixture on old posts, or trunks of trees, fences, &c., for two or three days. When the moths begin to scent the sugar, provide yourself with a small lantern giving light only on one side; visit each post and tree, and you will find moths by letting the light shine on the sweetened places. Then hold the bottle under one of them, and it will dart or fall into it; cork immediately or it will fly out. Then put the bottle in your pocket, and use another bottle to catch the next one, and by that time the first bottle will be ready for use again. You can thus visit each post, and when you reach the last one it is better to put the moths into a box, so that the new ones will not spoil them by flying among them. Some persons dip old rags into the syrup and hang them up to attract the moths.

DEAR SIR,—

From a friend in the neighborhood of Salt Lake, Utah Territory, I received a small lot of Lepidoptera, and as collectors would no doubt be pleased to learn something of the fauna of that locality, I will give you a list of the insects received, viz:

Papilio daunas Boisd,
Pieris protodice Boisd. & Lec.,
Anthocaris ausonides Boisd.,
Colias eurytheme Boisd.,
Vanessa antiopa Linn.,
Pyrameis caryae Hübn.,
Lycaena anna,
Chrysophanus helloides Boisd.
Gnophaela vermiculata,
Deilephila lineata,
Platysamia gloverii Strecker,
Arctia americana,
Catocala faustina? Strecker,
Erebus odora,

Of Platysamia gloverii I received two examples, both males, and as there were none of P. cecropia among the lot, I would take it to be a proof that gloverii is not a form of that species. Besides the differences

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between the two species are too marked to leave any doubt of their being distinct. Mr. Hermann Strecker informs me that he has never heard of P. cecropia being taken west of the Mississippi River. The example of Anthocharis ausonides differs somewhat from my specimen of that species from California, and resembles more the European Anthocharis belia.

EDW. L. GRAEF, Brooklyn, N. Y.

DEAR SIR,—

In reply to the synonyms selected by Mr. Morrison (on page 79 of this volume), from my frequent papers during the last thirteen years, I wish to state that *Orthosia ferrugineoides* Grote ex. Guen. is a different species from *Orthosia ralla* Grote ex. G. & R.; the latter differs by the pellucid yellowish hind wings, not clouded with fuscous, and the black dots of the subterminal line, among other characters. *Plusia ou* is twice the size of *P. fratella*, and I have seen no intermediate specimens. It is not right to express oneself in such a manner, that my synonyms in the Noctuidae, occurring from time to time during the description of over four hundred new species (in the face of the difficulties imposed upon students by the works of Gueneé and Walker) over a long period of time, appear to be charged as committed within six months. Of the six synonyms I am charged with, one is an error of Mr. Morrison's, and only two were published in 1874; the remaining three species were published and *figured* by me in 1863, 1864 and 1870 respectively. I also have shown *Tricopis* and *Euleucyptera* to be distinct, and I take issue with Mr. Morrison as to the validity of *Bolina nigrescens* as distinct from *fasciolaris*, and on the authority of my catalogue names.

Mr. Morrison remarks (p. 79) that "in ignoring (?) Mr. Grote's genera *Eucoptocnemis*, *Exyra* and others (?) I simply follow the example of Dr. Speyer," etc. Now, the fact is, that on the only occasion which Dr. Speyer has yet had to refer to one of these genera of mine, it is *adopted*, not *ignored* (vide *Leucobrephos* Speyer, Stett. Ent. Zeit., 1875, 175). There are, however, only *three* such names in my whole List, viz., *Conservula*, *Exyra* and *Leucobrephos*. The diagnosis of *Tricholita* is given by Mr. Morrison under the term "*Perigrapha*," which applies to a different form; *Eucoptocnemis* is distinctly and properly founded on structural characters given by Gueneé to the single species: *fimbriaris*. The other generic names of mine without diagnosis in the "List" replace, for one sufficient reason or another, a name previously used.

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I do not consider it an adequate reply to my criticisms of Mr. Morrison's publications, or to my complaints as to some misrepresentaions of my writings by Mr. Morrison, that certain synonyms of mine (corrected previously by myself) are brought up and offered as an answer to the one and as an apology for the other. My original remarks remain rather in full force, with the one exception where they refer to *Agrotis exsertistigma*, for which latter I am sorry and have excused myself on the ground of Mr. Morrison's retention of my material. In reply to Mr. Morrison's justification of *Eutricopis*, there appears no character but the unarmed tibiae to distinguish it from other Heliothid genera in Mr. Morrison's diagnosis, and it is there expressly stated to differ by the "unarmed tibiae." Now the term implies that it is "beautifully armed," and hence is inappropriate. With regard to Mr. Morrison's insinuations as to missing species in my "List," it is the great good fortune of this "List" that it is incomplete and thus awaits changes at Mr. Morrison's hands. My List must be judged, however, by its predecessors in the same field, and not by information acquired subsequent to its issuance. I wish to draw, once for all, attention to the fact, that the most of Mr. Morrison's corrections in the shape of criticisms are *ex post facto*. Mistakes corrected by myself, determinations made by me when in England and France, are taken as part of our common stock of knowledge by Mr. Morrison, and used on occasion against me. I reply also finally to Mr. Morrison's charge as to his redescription of *lilacina*, that the author of a description, and not the authority consulted on the subject, is the one accountable for publication, while I am sorry that in certain of the successful ventures of Mr. Morrison, where my responsibility is equal, I am neither mentioned nor my courtesy acknowledged.

A. R. GROTE.

[Having now given both of our correspondents a fair hearing, our limited space will oblige us to refrain from publishing anything further on this subject.—ED. C. E.]

DEAR SIR,—

I have recently united *Agrotis scandens* and *muraenula* in opposition to my previously expressed opinion (Trans. Am. Ent. Soc., 1873, 431), that they were distinct. Mr. Lintner now calls my attention to the fact and gives me good reasons for adhering to my previous opinion that the species are distinct. It appears that the specimens in the Buffalo Society's collection do in fact belong to one species, but I am wrong in referring both names to them.

A. R. GROTE.

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The Canadian Entomologist.

VOL. VII. LONDON, ONT., JUNE, 1875. No. 6

PRELIMINARY LIST OF THE NOCTUIDÆ OF CALIFORNIA.

Part VI.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

55. Agrotis exsertistigma Morrison (see ante p. 26). Sauzalito, Mr. Behrens, Oct., Nos. 16 and 209.

I sent specimens of this species to Mr. Morrison, keeping no memorandum or duplicates. Afterwards I supposed, from his brief comparison, that Mr. Morrison had described Californian specimens which I had considered as *alternata* Grote, under the new name. Subsequently Mr. Morrison returns me my specimen of *exsertistigma*, and I see that it is a distinct species which should not have been compared with *alternata*, as it is structurally different by the conical abdomen; the species should have been credited as received from me. That *redimacula* and *exsertistigma* are described by Mr. Morrison without any mention being made of the fact that I supplied the material either in part (*redimacula*) or wholly (*exsertistigma*), is a breach of etiquette. Mr. Morrison should not have hesitated to acknowledge so slight an indebtedness. *Agrotis alternata* does not appear to occur in California.

28. Agrotis cupidissima Grote (see ante pp. 214 and 27.)

Mendocino, June, Mr. Behrens, No. 4 (red label); also No. 164. The Californian specimens are light red colored, with powdery geminate lines, and variable in appearance; one is pale fawn, unicolorous, without marks on primaries save indications of the stigmata and the dotted t. p. line. Again, three specimens have the orbicular somewhat V-shaped, open above. The t. p. line is more regular than in *cupida;* it is accompanied by black dots. The subterminal line is nearer the margin than in either

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alternata or *cupida*, but it is more like *alternata* than it is *cupida* in its being irregular, accompanied with powdery black scales; it is preceded on costa by a blackish shade as in *cupida*. The present species I have formerly considered as *alternata* from the markings, and, on Mr. Morrison's authority as *cupida* fiom the color, but the reniform I now see is more kidney shaped than in either the Eastern *alternata* or *cupida*. I sent a specimen to Mr. Morrison to show the variability of what I supposed was his *exsertistigma*, and he informed me that the specimen was *cupida*. *Afterwards* he returned me my specimen of *exsertistigma*, recorded above, which I then saw was an entirely different species. I have subsequently adopted the view that the Californian specimens were *cupida*, and that I was in error in considering them to be *alternata*. I now reject both determinations, and consider that the Californian species is allied to both *alternata* and *cupida* and is a new species from the data given above. The habitus of *cupidissima* and size (39 m. m.) is rather that of *alternata*. The hind wings are a little paler at base in *cupidissima*, and the lunule more obvious. *A. cupida* does not as yet appear to occur in California. The provisional identification on page 27 (ante) must be erased and the present substituted. I use the number (56) for a different species.

56. Agrotis obeliscoides Gueneé.

No. 30 (red label) Mr Behrens.

The Californian specimens are very near to *sexatilis* Grote, which latter I am now inclined to consider synonymous with Gueneé's species. They appear to differ chiefly by the more constricted reniform marked with white, the want of costal discoloration and the less brightly red hue. More material is needed to make this determination certain, together with a positive identification of *obeliscoides*.

123. Mamestra passa Morrison, Proc. Bost. Soc. N. H., 2874, 139.

Unknown to me and very possibly the same as *Dianthoecia pensilis* Grote.

124. Graphiphora earina (Morrison) l. c., 158 (*Taeniocampa.*)

"California." Unknown to me.

125. Agrotcs inciris Gueneé, Morr. l. c., 164.

"California." Unknown to me from California. Mr. Morrison identifies my *Anicla Alabamæ* as this species too briefly described by Gueneé, who does not mention the dotted t. p. line.

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126. Agrotis purpura Morrison, l. c., 164.

Unknown to me and too briefly described at present for identification.

127. Catocala Aholibah Strecker, Lep., pl. 9, fig. 5.

Sauzalitae, Aug. 27th, Mr. Behrens.

128. Catocala mariana Hy. Edwards, Streck., No. 11, 99.

"Vancouver." Unknown to me.

129. Catocala hippolita Hy. Edwards, l. c., 99.

"California." Unknown to me,

130. Catocala Cleopatra Hy. Edwards, l. c., 99.

"California." Unknown to me.

131. Catocala Perdita Hy. Edwards, l. c. 100.

"California." Unknown to me.

132. Catocala adultera Hinze, Motsch. Etudes Ent., 1857, 47 ; Grote, List 41.

"California." Unknown to me.

133. Catocala Californica Edwards, Proc. Ent. Soc. Phil., 2, 509.

California (in coll. Am. Ent. Soc.)

134. Catocala zoe Behr., Trans. Am. Ent. Soc., 3, 24.

"Searsville, Cal." Unknown to me.

135. Catocala Stretchii Behr., l. c., 24.

"Virginia City." Unknown to me.

136. Catocala irene Behr., l. c. 24.

"Fort Tejon." Unknown to me.

137. Erebus odora (Linn.)

California (Behr).

138. Agassizia urbicola Behr., l. c., 23.

San Francisco (Behr). Unknown to me.

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139. Capnodes Californica Behr., l. c., 23.

"Downieville, Cal." Unknown to me.

140. Homoptera salicis Behr., l. c. 28.

Unknown to me.

141. Homoptera rosæ Behr., l. c., 28.

California, Mr. Hy. Edwards, No. 2487.

One specimen, smaller, but much resembling the Eastern *H. lunata.*

142. Pseudaglossa lubricalis (Geyer); Grote, List, 47.

California (Behrens).

143. Hypena Californica Behr., l. c., 23.

Oakland (Behrens).

144. Brephos Californicum Boisd., Ann. Soc. Ent. Belg., 12, 88.

"Se trouve au printemps dans les clairières des bois." Unknown to me.

145. Brephos melanis Boisd., l. c., 88.

"Habite les bois." Unknown to me. There is perhaps reason to surmise that neither species is correctly referred to this genus.

With the present paper I terminate the "Preliminary List," in the expectation of again taking up the subject with more material than that hitherto kindly placed at my disposal by Mr. James Behrens and Mr. Henry Edwards. In addition to the 145 species here cited, Dr. Behr has described a few species, too briefly for identification, in Mr. Strecker's publication. I regret that, while I was working on the subject, I should remain in ignorance as to the identity of Mr. Morrison's *passa* and *earina.* The former I think may be referable to *pensilis;* from the description I do not think the latter has come to my hands. In the 12th volume of the Annales de la Soeieté Belge, pp. 89—90, Dr. Boisduval enumerates 36 species of Californian Noctuidæ. They are in great part European species apparently incorrectly identified as Californian. With the exception of *Drasteria erecthea* and the two species of *Agrotis, jaculifera* and *saucia,* I think it very probable that the identifications are all incorrect.

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TINEINA FROM TEXAS.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from page 95.)

PHÆTUSA, *gen nov.*

I define this new genus with great hesitation and doubt as to the propriety of so doing. The only reason for separating the species described below, and which I place in this genus, from *Evippe (vid. E. prunifoliella, ante v. 5, p. 185)* is found in the neuration. The other characters are those of *Evippe*, and, as stated below, it is very near to *E. prunifoliella* in ornamentation. The neuration of the forewings is exactly that of *Eidothea vagatioella (loc. cit. sup. p. 187)*, which it also resembles in ornamentation, but less closely than it does *Evippe prunifoliella.* In the latter species the last branch of the median vein of the fore wings is simple ; in *E. vagatioella* and the species described below it is furcate at its origin. In *E. prunifoliella* and *E. vagatioella* the cell of the hind wings is open ; in this species it is distinctly closed. In *vagatioella* the median gives off a single branch, and there is an independent discal branch which arises at the median; in *prunifoliella* the median gives off two branches and has the discal branch vein as in *vagatioella ;* in this species it gives off the two branches, and has the discal branch as in *prunifoliella*, but in addition has another superior discal branch. Probably all three species should be included in the same genus, though *vagatioella* has the palpi longer than either of the others. In *prunifoliella* the second and third joints of the palpi are of about equal length ; in this species the third joint is a little longer than the second. In other respects the generic characters are the same. In all three the vertex is wider than long, and the face nearly as wide as long and very full or convex in front. All three form a section of *Gelechia*, and *Taygete difficilisella*, *Helice pallidochrella*, and *Sinoe fuscopalidella* are very closely allied to them structurally, though differing widely from them and resembling each other in ornamentation. *Neda plutella* also resembles this species in ornamentation, but the palpi are very different, and it differs widely in several respects.

The following remarks, in addition to what has heretofore been written on these allied species, may not be inappropriate in this connection, though they contain the results of examinations of the species before I saw the species described below.

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Sinoe fuscopalidella has a tongue, as I find on examination of fresh specimens, but it is short and inconspicuous. Probably it would be as well to include it with *Taygete difficilisella* and *Helice pallidochrella*, and possibly also *Gelechia obliquistrigella* in a single genus. *Evippe prunifoliella* and *Eidothea vagatioella* must, however, be separated from these because of their slender, more elongate and graceful forms and longer palpi, though they do not otherwise differ from *Helice pallidochrella* and the other species above named more than those species differ from each other. *H. pallidochrella* and *T. difficilisella* resemble each other closely in ornamentation, but *G. obliquistrigella* and *S. fuscopalidella* even more closely. The last named species may, however, be distinguished as follows: *obliquistrigella* has the second joint of the palpi brown without and white within, whilst in *pallidochrella* it is decidedly suffused with rufous on the outer surface at and towards the tip. *Obliquistrigella* is a trifle larger than the other, has the central portion of the wings streaked more distinctly with black, and has no raised tufts on the fore wings. The description of *fusco-ochrella* should be amended to state that the face is "white, faintly iridescent."

My genus *Agnippe* seems by its position in repose to be allied to *Swammerdamia*, of which no species has yet been found in this country. It also resembles that genus somewhat in ornamentation, but *pallidochrella* and *obliquistrigella* resemble it in this respect more closely, though they do not in the position which they assume in repose. Many *Gelechia*, however, have the same pattern of coloration. *Evippe* and *Eidothea* have the same position in repose with *Agnippe*, but they differ widely in form. *Sinoe*, *Helice* and *Agnippe* resemble *Laverna* in having raised tufts of scales on their wings, but many species of *Gelechia* also have them. In all these new genera the form and neuration of the wings approach more nearly to *Parasia*, *Cleodora*, &c.

P. plutella. N. sp.

The species resembles *Evippe prunifoliella* so closely that I do not deem it necessary to describe it otherwise than by referring to the differences between them. *Prunifoliella* has a small white spot on the base of the costa of the fore wings, a distinct white costal spot just before the ciliae, and a white streak in the apex, all of which are absent in this species. In *prunifoliella* the white of the dorsal margin sends three large almost triangular projections into the brown; in this species there are three scarcely perceptible emarginations only; in *prunifoliella*, except the

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silvery femora of the hind legs, the legs and tarsi are black, annulate at the joints with whitish; in this species the hind legs are yellowish silvery. *Prunifoliella* has an *alar ex.* of over 3/8 inch; this species is a little under 3/8. There are no raised tufts on any of my specimens, as there are in *E. prunifoliella*, and from the condition of the specimens it is scarcely probable that they could have been removed by attrition; it is possible, however, that there may have been some small ones, as it sometimes happens that small tufts on the wings are removed in setting or by rubbing, without leaving any marks by which their former presence could be detected.

PHIGALIA, *gen. nov.*

Palpi porrected, divergent, slender and simple, with the second joint nearly twice as long as the third, and a little clavate; no visible maxillary palpi. Head and face smooth, with scales appressed, the face nearly as wide as long, but little retreating; tongue small and scaled only at the base. Eyes full globose; basal joint of the antennae rather short and broad, with a few scales depending over the eyes (possibly the remains of a projecting tuft or of an eye-cap?); stalk simple, and about two-thirds as long as the forewings. The palpi and antennae remind one strongly of some species of *Coleophora*, but the face is too broad and the vertex too short.

The neuration and form of the fore wings is almost exactly that of *Perittia obscuropunctella*, as figured by Stainton, *Ins. Brit., v. 3*, the only difference being that the *Perittia* has the submedian vein furcate at the base, whilst in this species it is simple.

The neuration of the hind wings is also like that of *Perittia*, except that the fold is faintly visible; the wing is also a little narrower in the apical half. The wings are more coarsely scaled than in *Coleophora*, and the ciliae are shorter.

P. albella. N. sp.

Snowy white; under a lens a few scattered brown scales may be found in the apical part of the wing. *Al. ex.* 1/2 inch.

P. ochremaculella. N. sp.

I have not examined the neuration of this species, but the external characters are those of the preceding species, except that in this there is a distinct projecting tuft over the eyes.

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White, the palpi dusted with pale ochreous. The forewings are marked with short and indistinct ochreous dashes, one of which is on the fold before the middle, another is placed about the middle beneath the fold, but touching it; there is another just behind the middle on the disc; one on the costal margin just before the middle, and another further back just within the costal margin. At or just behind the discal vein are two small, though distinct circular raised tufts of brownish scales placed transversely. The apex of the wing is suffused with ochreous. It is a little larger than the preceding species.

The Texas collections contain other species belonging to the *Gelechidæ*, of which descriptions will be hereafter given.

DESCRIPTION OF A NEW SPECIES OF DRYOCAMPA.

BY G. J. BOWLES, MONTREAL.

Dryocampa pallida.

Head, thorax, abdomen and wings above, of a creamy white, without any trace of bands or markings. Beneath, the body and wings are also creamy white, the costa of both fore and hind wings being near the base very faintly tinged with yellowish pink. The legs are also slightly pinkish. Antennae pale brown. Palpi and other parts of the mouth yellowish.

Described from a specimen I took at Quebec, and now in my cabinet. It is a male, body .70 in. in length, expanse of wings 1.90. Two other specimens of the moth are in the collection of the Abbé Provancher, Quebec.

This insect is closely related to *D. rubicunda;* so much so that it has been named a variety of that species by Mr. Grote, from specimens taken in Kansas by Professor Glover, and figured by the latter on his unpublished plates of Lepidoptera. I subjoin Mr. Grote's description, from the Bulletin of the Buf. Soc. of Nat. Sci., Vol. 2, No. 3.

"*D. rubicunda* Fab., var. *alba* Grote.

"Both sexes entirely of a creamy white, the wings and body having lost all yellow and rosy tintings. The feet remain pink, and the costae beneath at base are sometimes faintly suffused. Kansas."

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It will be seen that the Kansas moth is identical with mine. I have no doubt but that the species is distinct from *rubicunda*. It is taken at Quebec, and is the only species of the sub-family Ceratocampadæ so far known to inhabit that locality. The distribution of this group, as given in Grote's "List" of the Platypterices and other sub-families of the Bombycidae (Nov., 1874) is interesting. All the species extend southward, some as far as Georgia, and some of them also spread into the more southerly parts of Canada. Only one *(rubicunda)* has heretofore been found in this Province, and that very sparingly. It has only been taken once, I believe, in the latitude of Montreal, and is unknown at Quebec. The new species is probably the most northern representative of the sub-family to which it belongs, and if the Kansas specimens come from the mountainous parts of that State, it would go far to support that supposition.

The early stages of the insect are as yet unknown, and it is rare in its occurrence at Quebec.

INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY REV. C. J. S. BETHUNE, M. A.

From Kirby's Fauna Boreali-Americana: Insecta.

(Continued from Vol. v, p. 213.)

FAMILY CLERIDÆ

332. NECROBIA VIOLACEA *Linn.*—Length of body 2⅓ lines. Taken abundantly on the journey.

[244.] Body dark blue, glossy, minutely punctured, rather hairy. Punctures on the head and prothorax nearly confluent and larger than those of the underside of the body; antennae black, last joint subquadrangular; sides of the prothorax obtusangular; scutellum black; longer punctures of the anterior half of the elytra arranged in rows, with the interstices minutely punctured; the rows then disappear, and the whole of the apex is indiscriminately and minutely punctured; legs black with a tint of brown.

[Taken in Canada.]

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333. THANASIMUS ABDOMINALIS *Kirby.*—Plate ii, fig. 5.—Length of body 4½ lines. Several specimens taken in Lat. 65°.

Body black, hairy, with longish white and some black hairs. Head punctured with two posteriorly converging impressed lines between the eyes; palpi and antennae dull rufous, last joint of the labial palpi, which are more than twice the length of the maxillary, very large and semi-cordate; last joint of the antennae, which are shorter than the prothorax, ovate and subacuminate; eyes kidney [245] -shaped, rufous, with a golden lustre; prothorax thickly punctured, not wider and not much longer than the head, constricted behind, and anteriorly with a pair of oblique impressions, one on each side; elytra minutely punctured, with larger punctures arranged in five rows, the two exterior ones reaching from the shoulder to the middle, and the interior ones not so far; the elytra are traversed by a pair of white undulato-angular bands formed of decumbent hairs; the first begins at the base below the scutellum, and running down along the suture for a little way, then diverges and forms the band, which is broadest at the lateral margin; the other band is near the apex, broad, and projects anteriorly into an angle; the legs are dull rufous; the abdomen is between testaceous and orange, with the tips of the segments paler.

[Synonymous with *T. (Clerus) undulatus* Say. Kirby's name *abdominalis* being preoccupied, was changed by Klug to *nubilus*, who did not recognize the identity with Say's species. Is occasionally taken in Canada.]

FAMILY CYPHONIDÆ.

334. CYPHON FUSCICEPS *Kirby.*—Length of body 1¾ lines. A single specimen taken.

Body lurid, downy. Head brown, mouth lurid; antennae mutilated in the specimen, but what remains is brown; prothorax very short, transverse, slightly bisinuate both anteriorly and posteriorly; disk embrowned; elytra very minutely and thickly punctured; breast and belly brown; thighs embrowned.

[Is taken in Canada.]

FAMILY TELEPHORIDÆ.

335. TELEPHORUS ATER *Linn.*—Length of body 2¾ lines. A single specimen taken in the journey from New York to Cumberland-house.

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[246.] Body black, rather hairy. Head suborbicular, obsoletely channelled; mouth, palpi, and base of the antennae, rufous; prothorax rather wider than long, very glossy; disk obsoletely channelled and a little elevated on each side the channel; anterior angles rounded; elytra minutely and confluently punctured, when elevated from the body they appear embrowned; tip of the thighs, tibiae, and tarsi, rufous.

336. TELEPHORUS WESTWOODII *Kirby*.—Length of body 5¼ lines. A single specimen taken in Lat. 65°.

Body black, downy. Head suborbicular, rufous with a black anteriorly tridentate band between the eyes; mandibles and palpi dusky at the tip; antennae shorter than the body, with the scape and the base of the pedicel or second joint, rufous; prothorax rufous, rather wider than long, anteriorly rounded, posteriorly transverse with the margin much reflexed; disk slightly channelled; elytra obsoletely punctured, or wrinkled, with three obsolete longitudinal elevated lines, the outer one abbreviated at both ends; legs dusky, base and apex of the four anterior thighs rufous; posterior thighs rufous, dusky at the tip.

337. TELEPHORUS SAMOUELLII *Kirby*.—Length of body 5¼ lines. Taken in the route from New York, in Lat. 65°, and in the Rocky Mountains.

Very like *T. Westwoodii*, but the antennae are dusky, pale at the base; between the eyes is a faint dusky cloud; the scutellum and the legs are testaceous, as are the sides and tips of the ventral segments of the abdo men as well as the anus.

[247] 338. TELEPHORUS CURTISII *Kirby*.—Length of body 4¼ lines. Taken in Lat. 65°.

Very like the preceding species, but it is smaller; there is a black band between the eyes; the prothorax is considerably longer and narrower in proportion, the posterior angles are more acute, and the tarsi are black.

[Taken by Agassiz's Expedition to Lake Superior.]

339. TELEPHORUS (MALTHACUS) PUNCTICOLLIS *Kirby*.—Plate vii, fig. 4.—Length of body 2⅓ lines. A single specimen taken in Lat. 54°.

[248]. Body black, rather hairy, with short decumbent white hairs. Head rhomboidal, lightly and minutely punctured; posteriorly obsoletely

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channelled; impressed between the eyes; pale-yellow below the antennæ; antennæ longer than the prothorax, three first joints underneath of a dull-red, second and third, taken together, scarcely longer than the fourth; prothorax nearly square, lightly and very minutely punctured; anterior angles rounded, posterior rectangular; disk channelled, and on each side the channel longitudinally elevated; sides luteous; posterior margin reflexed; elytra very minutely and thickly punctured; lateral margin anteriorly rather pale; legs black; trochanters and cubits dull-rufous.

[Belongs to *Podabrus*.]

340. TELEPHORUS (MALTHACUS) LÆVICOLLIS *Kirby*.—Length of body 3½ lines. A single specimen taken in the Rocky Mountains.

Body black, somewhat hoary with decumbent hairs. Head impunctured, impressed transversely between the eyes; mouth and three first joints of the antennæ luteous; prothorax nearly square, very glossy, impunctured; elytra less visibly punctured than in the preceding species: legs luteous, thighs brown at the base.

[Taken by Agassiz's Expedition to Lake Superior. Belongs to *Podabrus*.]

341. TELEPHORUS (MALTHACUS) MANDIBULARIS *Kirby*.—Length of body 2¾ lines. Several specimens taken in Lat. 65°.

Body all black, except the red mandibles, somewhat hoary with decumbent hairs. Hind-head received by the prothorax; eyes very prominent; antennæ longer than the prothorax; third joint nearly twice the length of the second; prothorax impunctured, scarcely wider than long, all the angles rounded; disk channelled, less elevated on each side; posterior lateral margins somewhat reflexed; elytra black, minutely and confluently punctured.

[Synonymous with *T. fraxini* Say. Taken in Canada; also by Agassiz's Expedition to Lake Superior.]

[249.] 342. TELEPHORUS (BRACHYNOTUS) BENNETII *Kirby*.—Length of body 6 lines. Taken in Canada by Dr. Bigsby, and in Massachusetts by Mr. Drake.

Body black, hoary with decumbent hairs. Head suborbicular, punctured behind the antennæ; neck rufous; front, before the antennæ, pale yellow; exterior margin of the nose black; mandibles yellow at the base; antennæ longer than the prothorax; prothorax pale yellow, disk

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elevated with a black irregular punctured spot; elytra minutely and confluently punctured, somewhat dilated externally; obsoletely tricarinate; legs black; knees rufous.

[Synonymous with *Podabrus tricostatus* Say; a common species in Canada.

FAMILY LAMPYRIDÆ.

343. LAMPYRIS CORUSCA *Linn.*—Length of body 4¾ lines. Taken at New York and Cumberland-house, Lat. 54°. In Canada by Dr. Bigsby.

Body oblong, pubescent, brown-black. Nose and mouth elongated; prothorax nearly semicircular, disk elevated; a rose-coloured arched streak dilated and yellower anteriorly adjoins the elevated part on each side; elytra obsoletely carinated, most numerously and minutely punctured.

[Belongs to *Ellychnia* Lec. Very common in Canada.]

ON GENERA IN THE MOTHS.

BY A. R. GROTE, BUFFALO, N. Y.

Since I am recently criticized for erecting new genera in the Sphingidæ, as it is thought unnecessarily, I have put together some of my thoughts on the subject in the present paper. In a review,* the friendly spirit of which I most gladly recognize, Mr. Moschler speaks of my division of the old genus *Smerinthus*, which I have restricted to the type *ocellatus*, *geminatus*, &c., and says in effect that since hybrids are known to occur between certain of the species, these could not be generically or tribally separated.† This brings up the question as to what the value of the higher divisions really is. And a little reflection will, I think, show us

* Stettiner Ent. Zeit., 1875, pp. 202 et seg.

† "Denn in welche Tribus gehorten wohl die hybriden Nachkommen Beiden?" l. c. 208. Here the word *Tribus* is used, but the idea seems to be that of *Gattung*. At any rate "Tribus" is merely a still further extension of the idea of relationship and what objections I find applies to either.

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that the higher divisions stand in a relative position to the "species." They are, in fact, extensions of the same idea. All are alike artificial in theory, and all classificatory terms are matters of practical necessity and convenience. As well might Mr. Moschler ask to what *species* do hybrids belong? Hybrids between distinct genera are noted elsewhere among animals. Collett has recently shown that the abnormal passion of the male ptarmigan in Norway leads to the production of hybrids between *Tetrao tetrix* and *Lagopus albus*. In fact this "abnormal passion" may be one of the means for the production of new species. Dr. Hagen * thinks that *Samia columbia* may be a hybrid between *Callosamia promethea* and *Samia cecropia*, species in my opinion strongly structurally and generically different. And Dr. Hagen further shows that interbreeding might be facilitated owing to the abundance of parasites which might check the due proportion of the sexes in either species. Perhaps, indeed, it may be rather owing to "abnormal passion," while the infested hybrid caterpillars might be additionally attractive to hymenopterous parasites. I am not favorably inclined to any "uniformity" in entomological nomenclature which will fall short in any way from a possible nearer expression of the facts in the case. The massing together in large genera of species offering structural peculiarities prevents our appreciation of these peculiarities, which is the point aimed at by systematic nomenclature. For instance, I cannot see why Mr. Riley, in his excellent article on the Hackberry Butterflies,† opposes the adoption of a different genus for our species, when he interestingly shows on the very first page that the allied European *Apatura* has a peculiar form, shape and arrangement of the wing scales.

Nor am I agreed that in proposing a generic name an author is obliged to construct a perfect diagnosis. The species being known to science, and all generic diagnoses being merely of comparative excellence, it cannot be expected that without a "uniformity" in comprehension there should be a "uniformity" in expression. Of course much depends on these points. Why a "uniformity" in generic designation should be so strongly urged when we see no "uniformity" in anything else relating to our mental development in the wide world, is difficult of comprehension. To me it seems that more exactness of definition is obtained by recognizing

* Bul. Buff. Soc. N. Sci., 2, 204.

† Trans. Acad. Sci., St. Louis, 1875, p. 193 et seq.

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smaller peculiarities by a distinctive generic name, and that still, with every disposition to be particular, both Mr. Scudder and myself, finding that we cannot separate certain species generically, i. e. the species of *Polygonia*, *Smerinthus*, etc., are justified in feeling that our genera stand on a scientific basis. There must be differences of opinion in Entomology as in other matters. For instance, Mr. Morrison describes under the name of *Agrotis scropulana* * a species from the White Mountains, and says of it that its "delicate shades of brown, blue and creamy white place it among the most beautiful in the Noctuidæ." And another species, called by him *Agrotis opipara*, "almost approaches" the first "in beauty." The first to me seems very like the Labradorian *Pachnobia carnea*, the latter like *Agrotis islandica*. And it is obvious here that, if these resemblances are founded, we must examine our appreciation of the generic characters of *Pachnobia* carefully, that we may come to a clear understanding of whether we have to do with an *Agrotis* or not. And again, if my suggestions eventuate, we will have fresh affinities of the Mount Washington Insect Fauna with that of Labrador, and more material to illustrate the relationship of the animals which formerly may have taken refuge on Mount Washington during a period of the decline of the Glacial Epoch, when the body of the species moved further north.

ON SOME OF OUR COMMON INSECTS.

Drasteria erichtea, Cram.

BY THE EDITOR.

In fig. 12 we have this insect in the perfect state well represented.

Fig. 12.

Although it is one of our commonest moths, a day-flier, abundant almost everywhere. yet we have never heard of its having had a common name bestowed upon it. We are not going to christen it, for we are no admirer of common names where they can be avoided, and we think they can in this instance. *Drasteria erichtea* is not harsh and unpronounceable, as is the case with

* Psyche, 1, 42.

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many, especially of our more recent names, as well as some that have been resurrected, and those who do not care to burden their memories with both names, may drop the latter and will still be understood if they speak of the moth as "the common *Drasteria*."

The female moth, when its wings are spread, will measure about one and a half inches; the male about a quarter of an inch less. The fore wings are grayish brown, with bands and dots of dark brown; one band crosses the wing about an eighth of an inch from the base, and a second —which sometimes does not extend entirely across—is placed midway between the first and the outer margin. There is a dull patch of brown near the front edge of the wing, between the first and second bands, and two or three prominent black dots similarly situated between the second band and the apex; the outer edge is also widely margined with brown.

The inner portion of the hind wings is similar in color to the front pair, the outer half is crossed by two darker bands irregular in outline, the space between them being occupied by a paler hue, as also is the space between the outside band and the hind margin, which latter is narrowly bordered with the darker shade. The markings on both wings vary much in intensity, being sometimes almost black, in other instances very faint.

The under surfaces of both wings are much paler, with the markings of the upper surface partially but indistinctly produced.

Drasteria erecthea appears among our earliest insects in spring, having passed the winter in the chrysalis state; it is also found up to quite a late period in the autumn. It frequents fields and meadows, and open grassy spots along the sides of our railroad tracks. Its flight is sudden, and after a short but rapid course, it as suddenly alights.

The caterpillar feeds on clover, and when full grown, measures one and a quarter inches in length or more. It has a medium sized head, rather flat in front, with darker longitudinal lines. The body above is reddish brown, with many longitudinal lines and stripes of a darker shade. There is a double whitish line down the back, with a stripe of the darker shade of brown on each side, and lower down close to the spiracles, is another stripe of the same dark hue, while between these two are faint longitudinal lines. The spaces between the segments, from fifth to eighth inclusive, are nearly black above, a feature only seen, however, when the body is coiled up; the larva readily assumes this attitude when disturbed.

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The under surface is a little darker than the upper, with many longitudinal lines of a still deeper shade, and a central stripe of blackish green from the sixth to the ninth segments. The feet and prolegs are greenish and semi-transparent, with faint lines and darker dots. This larva has but three pairs of prolegs, and hence it alternately arches and extends its body in progression.

The specimens from which the above description was taken were full grown by the third week in September, when they became chrysalids, and remained in that condition until early the following spring.

ON A NEW SPECIES OF TRICOPIS AND HOMOHADENA, AND REMARKS ON HOMOHADENA INDUTA.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Tricopis alencis. n. s.

This species, collected by Mr. G. H. Belfrage, in Bosque Co., Texas, Sept. 16th, differs from *T. chrysellus* by the broader, more olivaceous basal and median fasciae, narrowly united along the hind margin of the wing. The white fields of the primaries are thus less extended than in its congener. Subterminal line diffusely shaded with olivaceous, as is the terminal margin, leaving a whitish apical space. Fringes whitish, thorax light olivaceous. Hind wings less purely white, with a terminal olivaceous shading. Beneath much as in its ally, than which this is a smaller species, expanding 23 m. m. Mr. Belfrage regards this as a distinct form, and sends it under the number 117.

In a separation of the species with armed tibiae from *Heliothis*, the genera *Euleucyptera* and *Tricopis* I cannot consider with Mr. Morrison as synonymous, since the structure of the fore tibiae offers points of distinction which must be insisted upon in order to obtain a natural arrangement of the species. Only those names in Entomology are correctly styled "synonyms" which apply to equivalent forms.

Homohadeua figurata. n. s.

The body vestiture is scaly, mixed slightly with hairs. The size is that of *induta*. The color is more grayish than usual, and the basal

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streak is wanting in the specimen. The uniformly dark griseous primaries have the median lines alone visible ; these are narrow, black, approximate, of the usual K-shape, fused by a black dash below median vein. A series of terminal narrow black streaks. Fringes long, silky gray. Hind wings almost uniformly fuscous with whitish fringes, beneath paler with traces of a transverse line and a discal dot. Fore wings fuscous, with an outer line. Thorax and head like fore wings in color. Expanse 30 m. m. *Hab.* Nevada, Mr. Hy. Edwards, No. 2745.

The statement of Mr. Morrison, in the May number of the CANADIAN ENTOMOLOGIST, that *Homohadena induta* was the same as his *H. retroversa*, I read with surprise. From the description of the latter, after careful study, I had supposed it a redescription of *H. kappa*. Mr. Morrison says of *retroversa* : "coloration of *H. badistriga*." This is not true of *induta*, which wants the brown tinge entirely. He says the ordinary spots have "broad white annuli." This cannot be said of *induta*. Again, "the basal streak is obsolete," This is not true of *induta*, but of *kappa*. "The posterior wings are as in *badistriga*, etc.," he gives as another character, but it will not apply to *induta*. Mr. Morrison departs often from some more usual terms for color, which on that account renders it difficult at times to determine an insect from his descriptions. I feel that I have a sufficient excuse for my description of *induta*, while I am not prepared to admit the truth of Mr. Morrison's proposition that he has originally intended my species under the name of *retroversa*. I am not aware of *induta* occurring in Missouri, while Mr. Riley thought from a casual examination of *H. kappa* that he had taken that species in that State.

ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

We would invite the especial attention of all American Entomologists to the following paragraph, which appears in the circular recently issued by the Secretary of the A. A. A. S. :

"The attention of persons specially interested in Entomology is directed to the action taken by the Entomologists at the Hartford meeting, and to the fact that there will be a meeting of the Entomological

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Club of the Association at Detroit, on Tuesday, August 10th (the day preceding the meeting of the Association), at which all interested are invited to be present."

We trust that a large number of Entomologists will respond to this invitation, and bring with them everything new and rare which they can lay hands on. It is especially desired that authors bring the types of new species as far as possible.

C. V. RILEY, Secretary Ent. Club, A. A. A. S.

CORRESPONDENCE.

LUNA AND PROMETHEA.

DEAR SIR,—

In the last number of Mr. Strecker's work he states that neither *luna* nor *promethea* occur at Montreal, P. Q. My friend was led astray in this matter by my asking him for these species in exchange. In my letter I said that I had not taken them, and he very naturally concluded from that statement that they did not occur here. Both *luna* and *promethea* have been bred here by several collectors, but they are rather scarce in this locality.

Yours truly,

F. B. CAULFIELD, Montreal, P. Q.

BOOK NOTICES.

We have received from the author, with many thanks, a copy of his 7th Annual Report on the Noxious, Beneficial and other Insects of the State of Missouri, by C. V. Riley, State Entomologist, 8vo., pp. 196, with maps and illustrations.

This excellent report opens with a chapter on the Colorado Potato Beetle, in which is given information regarding the spread of the insect and the injuries inflicted by it, the use of Paris green and its influence on the plant and soil, as well as other details of interest. The Chinch Bug is next treated of in a more lengthy chapter, in which its history past and present

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is fully given, with instruction in the use of remedies for its suppression. The Flat-headed Apple Tree Borer next claims a share of attention; in this chapter a new parasite *(Bracon charus)* on the larva of this pest is described and figured. Following these are chapters full of interesting details in reference to Canker Worms, the Grape Phylloxera and the Rocky Mountain Locust. The work is furnished with an excellent index, and is written in a popular style, and is altogether a valuable contribution to our knowledge in the useful department of economic Entomology.

The Cincinnatti Quarterly Journal of Science, Vol. 2, No. 2. This number opens with an article on the Tineina of the United States, from the pen of our esteemed friend, V. T. Chambers, Covington, Ky. In this paper 32 new species are described and one new genus.

Among other interesting papers in this serial we notice one on Mastodon remains in Ohio, by John H. Klippart, Rambles of a Naturalist in South Florida, and The Use of Mica Plates by the Mound Builders; The Age of their Mounds, by S. S. Scoville, M. D.

BOOKS RECEIVED.

Synonymic List of the Butterflies of North America, North of Mexico (Nymphales), by Samuel H. Scudder. From the Bulletin of the Buffalo Society of Natural Sciences, February, 1875, 8vo., 30 pp.

Curious anomaly in history of certain larvæ of Acronycta oblinita Guen., by Thos. G. Gentry, 30 pp., from Proc. Acad. Nat. Sci., Philadelphia.

English Sparrows, by Thos. G. Gentry, from the American Naturalist.

Proceedings of the Boston Society of Natural History, Vol. 8, October to December, 1874.

Proceedings of the Academy of Natural Sciences, Philadelphia, October, November, December, 1875.

Newman's Entomologist to April, 1875.

The Zoologist to April, 1875.

The Scottish Naturalist, April, 1875.

The Horticulturist to June, 1875.

Journal of Education to May, 1875.

Nature to February 18th, 1875.

Science Gossip to May, 1875.

Psyche to May, 1875.

Le Naturaliste Canadien, 1875.

Monthly Report of the Department of Agriculture.

Prairie Farmer.

Indiana Farmer.

Canada Farmer.

Observer of Nature to June.

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The Canadian Entomologist.

VOL. VII. LONDON, ONT., JULY, 1875. No. 7

IMPORTANT TO ENTOMOLOGISTS.

In our last we briefly called attention to the fact that the Entomological Club of the American Association for the Advancement of Science would hold its first regular meeting on Tuesday, August the 10th, (the day preceding the meeting of the Association), at Detroit, Michigan. This organization of Entomologists, effected last year at the meeting in Hartford, promises to be an important one, embracing, as it does, within its ranks most of the leading Entomologists in America. Doubtless many important subjects will come up for discussion during the meeting, and among the rest (although we do not speak authoritatively) we doubt not but that the vexed and vexing subject of Entomological nomenclature will claim a fair share of attention. We sincerely hope that some rules will be devised which will result in establishing definitely and permanently the names by which we are to know many of the common insects which surround us, and that some limit will be placed to this everlasting searching among dry bones and continuous resurrecting of names from the musty records of the past, where in the interests of our favorite science they might in many instances have better remained forever forgotten. We do not propose to discuss here the subject of the question of priority, but we do firmly believe that we need the establishment of some rules by which the permanency of our names may be assured, if we do not wish to discourage and disgust the greater number of those valuable working members of our corps who have not time to investigate the merits of the various claims set forth by those who endeavour to lead us in these matters, but who are in many instances as much at variance with each other as the great bulk of the rank and file are disposed to be with them all; not—let it be understood—at variance with them personally; on the contrary, these persevering and talented labourers are held in the highest esteem, but it is felt that in their zeal in defence of the dead they are imposing on the living burdens unnecessary and grievous to be borne.

We anticipate that a large number of specimens will be brought together for the purposes of comparison and obtaining names, and thus much valuable information be elicited. We bespeak a large attendance

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of our "brethren of the net," and trust we shall not be disappointed, but that all who *can* come *will* come, and thus aid in sustaining the interest of the meetings. The Club is well officered; President, Dr. J. L. Le Conte; Vice-President, Samuel H. Scudder; Secretary, C. V. Riley. Mr. Riley, who is now in Europe, writes that he hopes to return in time to be present at the meetings.

In accordance with a resolution adopted at the time of the organization of the Club, the first meeting will be held at 2 : 30 p. m. on the day named.

ON LYCÆNA NEGLECTA, Edw.

BY J. A. LINTNER, ALBANY, N. Y.

In the very interesting paper of Mr. W. H. Edwards, published in the May number of this journal, in which another valuable addition is made to the knowledge of our Lepidoptera, by the identity therein shown of the Lycænas *pseudargiolus* and *violacea*—autumnal and vernal forms of the same species—it is suggested that *neglecta* and *lucia* may prove to bear the same relationship to one another. The possibility of this is inferred by Mr. Edwards from observations made by him, that *lucia* is an early spring form (April and May in New York), and *neglecta* a later one, "occurring at intervals from June till September."

I cannot believe that *neglecta* and *lucia* will ever be united as seasonal varieties of the same species. Several years of diligent collecting by Mr. Meske and myself in this portion of the State, embracing a range of ten miles of territory, have failed to reveal a single example of *lucia*, nor has it come under our observation in any of the collections made by others in this part of the State. We might, therefore, be almost justified in asserting that it does not occur here. We have it from Long Island collected by Mr. Graef and Mr. Tepper.

On the other hand, in that famous collecting ground, Center, on the "pine-barrens," midway betweeen Albany and Schenectady, upon the line of the N. Y. Central and Hudson River R. R., than which, we believe, the Northern United States can produce no superior locality for the Lepidoptera, *neglecta* usually, at its proper season, swarms. There have been times and seasons when, as we have traversed the roadways leading

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over the yellow sands of Center and among its pines, that the air about us has seemed blue from the myriads of *neglecta* driven up from the damp sands by our approach. Here, certainly, one might confidently look for *lucia*, were it but a varietal form.

Our observations and records do not agree with those of Mr. Edwards, giving June as the earliest appearance of *neglecta*. From notes made by me, and from dates of capture appended to examples in my collection, I cite the following:

In the year 1869, on May 21st, *neglecta* occurred in great abundance, all of which noticed, with three exceptions, were males. The worn condition of some of the captures indicated that they had already been abroad for several days. The locality had not been explored since the 11th of May, when the species was not found. About the 9th of June it was observed at its greatest abundance; it was seen for the last time during this year on the 30th of July. In 1870, it was first observed on the 14th of May (none in a collecting trip on the 6th). The last recorded appearance was on the 16th of June. *L. comyntas* was seen from May 6th to Sept. 14th, continuously. In 1871, *neglecta* is recorded from May 16th to June 16th. In the following year its first record is on May 21st.

The latest date of my capture of this species is August 20th, at Schoharie, N. Y.; the earliest is at Bath-on-the-Hudson, near Albany, on May 14th (the year not stated).

The observations which I have given above, when coupled with those of Mr. Saunders appended to the paper above referred to, of the frequent occurrence of *neglecta* in his neighborhood (London, Ont.,) and non-occurrence of *lucia*, would seem almost to establish beyond question their non-identity. That these statements may receive all the consideration to which they are entitled, it may be proper to accompany them with the mention made to me by Mr. Scudder, not to be construed to the disparagement of the valued labors of others, that, as the result of an elaborate tabulation of the numerous returns made to him or collated by him, of the Rhopalocerous fauna of the various portions of the United States, the two most thoroughly worked up fields were found to be those of London, Ont., and Albany, N. Y.

As a part of the history of *neglecta*, it may deserve mention that Mr. Meske reports the species as quite rare this year at Center, where in so many preceding years it has abounded.

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TINEINA FROM CANADA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

Gelechia basqueella.

Œcophora basqueella, ante p. 92.

By some unaccountable error, this species is described *loc. cit.* as an *Œcophora*, while a true *Œcophora*, which I intended to publish as *Œ. australisella*, does not appear at all. I have received *G. basqueella* from Prof. Riley, taken in Missouri, as well as from Texas.

A small collection of Tineina from Canada, received by me from Mr. F. H. Belanger, of the Universite Laval, Quebec, contains the following species, all of which, with, perhaps, two exceptions, are now in the collection of the University.

Tischeria bodicella Cham.

Coleophora coruscipennella Clem. (It is proper to state here that the species described by me as *C. auropurpuriella* is the same previously described by Dr. Clemens under the above name. I have taken it at Covington, Kentucky, and at the Bee Spring camp of the Kentucky Geological Survey, near Mammoth Cave.)

Coleophora cretaticostella Clem. ? I have also taken this species at Covington, but I identify it doubtfully as Dr. Clemens' species, because Dr. Clemens says "palpi white," while in these specimens they are yellowish; and Dr. Clemens also says "inner margin of the forewing whitish," which is not correct as to these specimens. In other respects Dr. Clemens' description applies accurately enough.

Tinea tapetzella Auct. ?

This species is described as having the labial palpi white, with the outer surface of the second joint dark brown. The specimen before me differs by having them ochreous, with the outer surface of both joints brown. It differs also from all descriptions of *T. tapetzella* that I have seen in having the tips of the thorax and patagia reddish ochreous, though in all other respects (even to the *Ex. alar* 9 lines) it is *T. tapetzella*. I therefore place it doubtfully as that species. *T. tapetzella* is a well

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known European species, feeding in dry goods, &c., and has never been described from America except in the instance of a single specimen described by Dr. Clemens from Virginia, and Dr. Clemens did not know whether that was bred in America. I have never seen it, unless the specimen in Mr. Belanger's collection be the same.

Tinea pellionella ?

This well known European insect has not heretofore been recorded from this country. One of the two specimens now before me was bred from a larva taken in its case in a house in Covington ; another taken at the same time and place produced an Ichneumonide parasite. The other specimen was received from Mr. Belanger. Both these specimens lack the obscure brown spot on the disc of *T. pellionella*, but have the spot on the fold and at the end of the cell, and otherwise agree with the descriptions of *T. pellionella* The case of my bred specimen was made of pieces of carpet.

Solenobia Walshella Clem.

Tinea auropulvella Cham., *ante v. 5, p. 90.* Mr. Belanger's specimen is in better condition than any of those from which I described the species, and I am enabled to correct the former description as follows : The dusting of the wings is not so much scattered as might be inferred from that description, and is more properly described as pale ochreous than as reddish or brownish golden, though in some lights they exhibit these hues distinctly. The first and second brown costal spots near the base are connected along the extreme costa, and the "last one behind the middle" connects above the fold with a narrower pale ochreous streak, which passes obliquely forwards to the dorsal margin ; and the patagia are brown at their bases. In a previous paper I have described several species from Kentucky, which are white marked with brown, approaching the European *T. granella*, and in this paper shall describe several others. There seems to be an abundance of these species in America, and Dr. Clemens has described one as *T. variatella*, which Mr. Stainton suggests in his edition of the Clemens papers is probably *T. granella.* But after comparing my species and Dr. Clemens' description with Mr. Stainton's description of *T. granella* in *Ins. Brit., v. 3.*, I can not consider any of the described American species as *T. granella.*

Bucculatrix albicapitella Cham.

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The specimen in Mr. Belanger's collection differs from all of my specimens in having the dorsal spot prolonged towards the apex till it meets in the apical part of the wing with the second costal streak, in having the apical spot more definite, and the dusting in the ciliæ so arranged as to form two short hinder marginal lines. I have no doubt it is the same species. The pattern of ornamentation (not the colors) of this species is almost exactly that of the *right* wing in Mr. Stainton's figure of *B. demaryella*, but the left wing in the figure is very different. *Vid. Nat. Hist. Tin., v. 7.*

Lithocolletis salicifoliella, CAN. ENT., *v. 3., p. 163.*

" *Scudderella* Frey. & Boll. ? *Ent. Zeitung, p. 212.*

In the collection received from Mr. Belanger is a single specimen of this species, together with the mined leaf of poplar, from which it was bred. It has heretofore been found only in Willow leaves. It is an exceedingly variable species, some specimens being so densely dusted with brown or gray brown scales as to suggest a resemblance to the European species *L. populifoliella*, whilst others are almost free from dusting, and may be described as having a ground color of pale golden or saffron marked with white. In the former description of this species I was led by the resemblance of the more densely dusted specimens to *L. populifoliella*, as figured by Mr. Stainton in *Nat. Hist. Tin., v. 2*, and the position in which *L. pastorella* is there placed in his classification of the species of this genus, to suggest that it might be identical with *pastorella*. Perhaps the following description may convey a better idea of an average specimen than the one previously given.

Thorax and primaries bright golden or saffron yellow, according to the light, or even sometimes dull brownish yellow, the thorax and basal portion of the dorsal margin of the fore wings being largely intermixed with white and dusted more or less with black; sometimes the inner angle is of the general ground hue, scarcely dusted or marked with either white or dark brown, and then there is a median white basal streak which meets at an acute angle with a dorsal white streak about the basal fourth of the wing length. Both of these white streaks and all other white markings on the wings are more or less dusted with dark gray brown, sometimes so much as to obscure the white. Before the middle of the costa is a long white streak, which attains the middle of the wing, curving backwards; a little behind this, on the dorsal margin, is a large dorsal white streak, wide

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on the margin, but shorter than the first costal streak, like which it curves backwards along the middle of the wing, being usually confluent or very nearly so with the first costal streak; a little further back, about the middle of the costal margin, is another white costal streak shorter than the first, but like it curving back along the middle of the wing, and usually confluent with the first costal and first dorsal streaks. Then follows another narrower and somewhat oblique costal white streak, opposite to which is a triangular white dorsal spot separated from it by some brown scales; just before the ciliae is a curved white fascia concave towards the apex and sometimes interrupted in the middle, and just before the apex is another similar fascia, which, however, sometimes does not attain the dorsal margin, and behind it in the apex is a short brown streak. All these white streaks and fasciæ are decidedly dark margined before, and more or less dusted with grayish brown. There is a brown hinder marginal line at the base of the ciliae, which latter are stramineous.

In the former description the white dusted with gray brown was considered the ground color, and the golden or saffron as markings on that ground, as in *L. hamadryadella* Clem., and *L. sylvella* Stainton, and *L. populifoliella* Zell., and the species was considered as belonging to the same group with the latter. In this description I have perhaps more properly considered the golden or yellowish hue as the ground color, and the white dusted portions as the markings as in Mr. Stainton's group, 3, *Nat. Hist. Tin., v. 2.* Hence the apparent difference.

Since the publication of my description of this species, Prof. Frey, of Zurich, has described under the name of *L. Scuderella* a species bred by him from mined Willow leaves, gathered in Massachusetts, which is probably identical with this. At my first examination of Prof. Frey's description I thought otherwise, being unable to recognize this insect in Prof. Frey's description, though they certainly agree in one peculiar characteristic, viz., dark brown bands on the first pair of legs, to which Prof. Frey first drew attention in his description. The discrepancies between my specimens and the Professor's description are chiefly in the markings of the fore wings. But these may result from the variations in the markings of the insect itself. Prof. Frey's specimens seem to have been remarkably free from the dusting of brownish or gray brown scales, and as I understand his description, one of the two fasciæ in the apical part of the wing is not mentioned. Still, considering the difficulty of describing an insect so peculiarly marked and so variable as this species, the probability is that it is *L. salicifoliella* Clem.

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Prof. Frey notices the dark anterior surfaces of the legs in this species as remarkable, but the species is by no means singular in this respect. *L. tritaeniædla* and other species are marked in the same way, and I did not consider it important to mention this character in the original specific diagnosis of either species. Some specimens of *salicifoliella* are much paler than others, and occasionally the dark margins of the fasciae are very indistinct. Prof. Frey seems to have been misled by the mention of *L. pastorella* by me in connection with this species. I wrote that this species bore a strong *general* resemblance to *L. populifoliella*, as figured *(Nat. Hist. Tin.,)* and as in that work *pastorella* and *populifoliella* are placed in the same group, I wrote that "it is not impossible that this is *L. pastorella.*" *Pastorella* and *populifoliella* are known to me only through the *Nat. Hist. Tin.*, and comparing the most densely dusted specimens of *salicifoliella* with the figures in that work, I still think it should be placed in the same group with those species.

ON ORTHOSIA RALLA, Gr. & Rob.

BY J. A. LINTNER, ALBANY, N. Y.

In the April number of this journal, page 79, it is asserted by Mr. Morrison that "the well known *Orthosia ferruginoides* Guen. is re-described as *Xanthia ralla* Gr. & Rob."

Having examined the type specimen of *ralla*, in the possession of the Buffalo Society of Natural Sciences, I am able to pronounce it entirely distinct, and further, that it differs so much from the species to which it is above referred that there would seem to be no valid excuse for the erroneous reference.

In *ralla* the anterior wings are quite produced in their outer margin at vein 3, and considerably excavated thence to the costa; this marked feature is not fully shown in the figure, in Trans. Am. Ent. Soc., i, pl vii. The transverse lines are much more decided than in *ferruginoides.* The anterior transverse line is less sinuous; the post. trans. strongly lunulated line is quite distinct. The conspicuous interspaceal black dots constituting the subterminal line, might, by the the careless observer, be mistaken for the black nervular dots or dashes of the lunules of the preceding line in *ferruginoides.*. The orbicular has an interior black dot

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and a black dash inferiorly, which *ferruginoides* has not, and its annulus is scarcely defined. The reniform contains inferiorly three black spots. The black dashes which mark the tips of the veins in this are not present in *ferruginoides*, and the fringes are more heavily cut with blackish in the former. In *ralla* the secondaries are pellucid, and without a trace of lines above, while in the other they show a median line, a subterminal band, and are fuscous toward their internal margin.

In view of the marked differences in the two species, it is believed that their pronounced identity is based on an erroneous determination of *ralla* or a simple recollection of its general appearance. It is much to be deplored that synonymical dicta so frequently find their way in print, to our perplexity or annoyance, manifestly wanting in the authority of critical observation or the use of available means of information. To such a neglect we are disposed to refer the recent union, as "dimorphic forms," of three well defined species of *Agrotis*, viz., *subgothica*, *herilis* and *tricera*—entirely unsupported by observations and experiments such as have placed the polymorphic and dimorphic forms of *Papilio ajax*, *Grapta interrogationis* and *Lycaena pseudargiolus* of Edwards, outside of the field of conjecture or prejudice, in a region of absolute certainty.

INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY REV. C. J. S. BETHUNE, M. A.

From Kirby's Fauna Boreali-Americana : Insecta.

(Continued from Vol. vii, p. 113.)

[250.] II.—ORTHOPTERA.

FAMILY LOCUSTIDÆ.

344. LOCUSTA LEUCOSTOMA *Kirby*.—Length of body 13½ lines. A single specimen taken in Lat. 65°.

Body obscurely rufous, clouded with darker shades. Upper lip, and large spot of the mandibles, white; palpi reddish, with the two last joints whiter, summit black; antennae as long as the trunk, which on the upper side is subpubescent; last segment of the prothorax carinated; tegmina

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cinereous, with piceous and rufo-piceous nervures; and at the base is a longitudinal mesal series of black spots; the legs are rufo-testaceous, with the summit of the thighs and the spines black; the posterior thighs above are clouded with the same colour.

[Synonymous with *Caloptenus bivittatus* Say. This species is found in Canada and the New England States, as far south as Maryland and Texas, westward to Nebraska and Minnesota, and northward to Lake Winnepeg.

345. LOCUSTA VERRUCULATA *Kirby*.—Length of body 12¾ lines. A single specimen taken in Lat. 57°.

[251.] Body cinereous, sprinkled with black dots or punctures, and indistinct spots. Head punctured; palpi white at the tip; mandibles piceous; antennae shorter. than the trunk, pale, black at the tip and longitudinally concavo-convex; prothorax with an entire longitudinal dorsal ridge, wrinkled, and warty from the wrinkles; tegmina with a reddish tint, irregularly reticulated; wings with a black mesal band, and reddish-yellow nervures; abdomen pale underneath.

[Belongs to the genus *Œdipoda* Latr. Is taken in Canada and the New England States; has been found also at Lake Winnepeg.]

FAMILY ACRYDIADÆ.

346. ACRYDIUM GRANULATUM *Kirby*.—Length of body 5 lines. A single specimen taken in Lat. 65°.

Body black, sprinkled with numberless very minute elevated points or granules. Prothorax cinereous, clouded obscurely with black, three-ridged; with middle ridge straight, and the lateral ones curved at the base; rudiments of the tegmina cinereous, ridged, punctured with excavated punctures; nervures of the wings black, those of the costal area white; the four anterior tibiæ are reddish, obscurely banded or rather annulated with white.

[Belongs to the genus *Tettix* Latr. Taken by White in Sir J. Richardson's Arctic Searching Expedition, on the borders of the Mackenzie and Slave Rivers, and Fort Simpson. Found also in N. E. States and Minnesota.

[252.] III.—NEUROPTERA.

FAMILY AGRIONIDÆ.

347. AGRION PUELLA *Linn.*

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Variety B. Trunk sea-green, above black with two sea-green longitudinal stripes; abdomen black, sea-green at the base, inscribed with black; legs black above, underneath sea-green or white; the stigma of the wings is blackish with a transparent margin.

C. Trunk black and white with two dorsal white longitudinal stripes; legs black; stigma of the wings black; abdomen mutilated.

Both taken in Lat. 65°.

[Hagen (Synopsis of Neuroptera of N. A., p. 98) says that this is "perhaps another species which is inextricable."]

FAMILY PERLIDÆ.

348. PERLA BICAUDATA *Linn.*—Length of body about 7½ lines. Several specimens taken in Lat. 68°.

[253.] Body black, hairy. Antennae, tibiae, tarsi, caudal setae, and wings dull testaceous; the vertex consists of a yellowish membranous spot; the joints of the caudal antenniform organs are dark at the tip.

The larva is white underneath, fusco-cinereous above; head and thorax spotted with white, with a pale longitudinal line. More than one species seems to have passed under the name of *Phryganea bicaudata.* I will not affirm that the present species is not distinct: but as the specimens were not perfect, I thought it best to consider them as belonging to that type.

[Synonymous with *P. frontalis* Newman. Taken at St. Martin's Falls, Albany River, Hudson's Bay; at Trenton Falls, N. Y., and in Ohio.]

IV.—TRICHOPTERA.

FAMILY PHRYGANIDAE.

349. LIMNEPHILUS NEBULOSUS *Kirby.*—Length of body 7 lines. A single specimen taken in Lat. 65°.

Body black, hairy with whitish hairs. Antennae are mutilated in the specimen, but the base is black; scutellum testaceous; upper wings testaceous, spotted and dotted with white except the costal area, which is without any of that colour; under wings white with testaceous nervures; legs testaceous.

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350. LIMNEPHILUS FEMORALIS *Kirby.*—Length of body 6½ lines. Taken with the preceding.

Very like the preceding species, but paler, with black scutellum and thighs.

[Both species are unknown to Dr. Hagen.]

ANNUAL MEETING OF THE MONTREAL BRANCH.

The second annual meeting of the Montreal Branch of the Entomological Society of Ontario was held on May 4th, 1875, when the following officers were elected for the ensuing year :—

G. J. Bowles, President ; Alexander Gibb, Vice-President ; C. W. Pearson, Secretary-Treasurer ; G. B. Pearson, Curator ; W. Couper, M. Kollmar, T. B. Caulfield, Council.

The reports of the Council and Secretary-Treasurer were read and adopted. The Branch is progressing steadily, and our list of membership is increasing. During the past year working expenses have all been paid, leaving a balance on hand ; a number of papers have been read, and the exhibitions of local and exotic rarities were exceedingly good. The Branch holds its meetings in the rooms of the Montreal Natural History Society, University St. All business communications to be addressed to

C. W. PEARSON,
The Burland Desbarats Co'y, Montreal, P. Q.

Annual Report of the Council of the Montreal Branch of the Entomological Society of Ontario :

Your Council, in presenting their second annual report, have great pleasure in stating that the Branch has progressed steadily since its first meeting in August, 1873. During the past year eight new members were elected, making the total number of twenty, one of whom has since gone to Europe.

The papers read during the year are as follows :

"Notes on the Larva of *Leucania pseudargyria* Guenée," by F. B. Caulfield ; "On a Dipterous Insect Destroying the Roots of Cabbage," by Wm. Couper ; "Notes of Some Species of the Genus *Grapta*, found in

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the Vicinity of Montreal," by F. B. Caulfield; "On Tineidæ," by Wm. Couper; "On Tineidæ," by F. B. Caulfield; "A List of the Bombycidæ of Quebec," by G. J. Bowles; "On the Catocalidae Occurring in the Vicinity of Montreal," by C. W. Pearson; "A List of the Diurnal Lepidoptera Occurring on the Island of Montreal," by F. B. Caulfield; "On the Usefulness of Spiders," by J. G. Jack; "A List of Sphingidae Occurring on the Island of Montreal," by F. B. Caulfield.

The monthly meetings were fairly attended, and the exhibitions of Entomological material conspicuously illustrated the energy of the members in accumulating rare insects from various localities. The Branch having decided to hold their meetings in future in the rooms of the Montreal Natural History Society, it was found necessary to change the night of meeting from the first Wednesday to the first Tuesday in each month, and in order to meet the extra outlay for rental, it was decided to make the subscription twenty-five cents a month, which the Council presume will suffice for present emergencies. On the 1st of last July the members proceeded to Chateauguay Basin for a field day. The members were the guests of Mr. R. Jack, of Hillside, who treated them with true hospitality.

Your Council have ordered *Psyche*, a useful Entomological publication issued in Cambridge, Mass.

A suggestion made by your Council last year, that note books should be carried by members, has, in this instance, been fruitful in producing valuable lists and data of the occurrence of insects in our neighborhood, and we trust that some of our members will devote their leisure this season to the much neglected orders of Hemiptera, Neuroptera and Diptera.

All of which is respectfully submitted.

WM. COUPER, Chairman.

G. J. BOWLES,
C. W. PEARSON.

NOTES ON CALOPTENUS SPRETUS.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

The natural history of the migratory grasshopper, *Caloptenus spretus* Uhler, being imperfectly known even to our best western Entomologists, I have given the subject considerable attention during nearly two years

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residence here, where I have had ample opportunity for observation. My most important discovery is that this species is double brooded. This is evident from the fact that in 1873 large numbers came here from the south, laid eggs and produced a second brood that flew south in August of the same year. This accounts for their migrations. They can not be local anywhere, because there would not be sufficient herbage to support a second brood in a region already laid bare by the first; and because in the northern part of their range the season is not long enough to mature two broods. They must, therefore, migrate every year; and their migrations are conducted as follows:

Hatching in Texas, New Mexico and Arizona early in spring, these insects, as soon as matured, fly north and deposit their eggs on this latitude about the last of May, although they arrived here this year as early as May 12th. They probably do not lay many eggs south of Nebraska, but they go much farther north. The second brood being able to fly in August, goes south with the first favorable wind, reaching Texas in September, where they deposit eggs to lie over winter. But as eggs were deposited by the first brood all along their route, from Kansas probably to the northernmost limit of vegetation; the young from these eggs are proportionally later, and, as they acquire their wings and fly south during the autumn months, each successive brood necessarily falls short of the extreme southern limit reached by its immediate predecessor, and many being retarded by contrary winds, cold and storms, eggs are deposited over nearly the whole extent of country traversed by their ancestors in the spring.

The next spring, the new brood hatching in Texas and all hatching farther north that acquire wings earlier than the 20th of June or 1st of July, fly north, while those maturing later fly south. They deposit eggs that produce a second brood, as before, which lays eggs for the spring brood. The second brood always flies south. Thus we see that this grasshopper is not forced upon its migrations for want of food, as is commonly asserted by Entomologists, but is guided in its flights by that instinct which teaches every insect to provide for its young. The natural habitat of this insect is probably the plains lying east of the Rocky Mountains, where it goes through its annual migrations as I have described. Now, let us see how it can spread into the cultivated districts of the Mississippi valley without moving directly east. When ready to fly, it always waits for a favorable wind; and, if it is going north, will take

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advantage of a south, south-east or south-west wind upon which to travel. If, then, they leave their hatching ground in the far south with a south-west wind, they would be carried far to the east before reaching their northern limit. Likewise, when the second brood was ready to fly south, if the prevailing winds should come from the north-west, the hordes would be swept over Nebraska, Kansas, etc., and into Texas. A continuous south-west wind the next spring would take the spring brood still farther east, while, on the other hand, south-east winds would carry them back toward the plains.

As the *C. spretus* always leaves its hatching grounds without depositing eggs, Entomologists have jumped to the conclusion that broods raised on the plains are barren or incapable of producing young; but the fact is that they are not ready to deposit until two or three weeks after getting their wings, which time they invariably take advantage of to remove themselves several hundred miles from their place of birth.

NEW NOCTUIDAE.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

ERRATA.—In my article in the last number, *Tricopis alencis* should read *Tricopis aleucis.*

Tarache lactipennis, n. s.

Allied to *cretata,* but very much larger. Head, thorax and a narrow oblique basal patch deep brown. A metallic tuft on the thorax behind. Fore wings milk white. A subterminal broad, deep, olive shade from apices to internal margin, containing a narrow, dentate, lilac-white line. A greenish costal spot at about apical third. Terminal space whitish, with a terminal dark shade line. Hind wings and abdomen white, the former with a very slight fuscous edging. Beneath primaries wholly dark, except along internal margin; hind wings wholly white. *Expanse* 28 m. m. *Habitat* Texas (G. W. Belfrage, May 3, No. 111.)

Differs from *Tarache metallica* at once by the white secondaries and abdomen, as well as the absence of costal basal marks and the dentate

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continuous lilac-white subterminal line. Perhaps the handsomest species of the genus, some of the American species of which appear to imitate *Eudryas* in their green and olive colors, as already suggested by Mr. Grote.

Ipimorpha intexta, n. s.

Allied to *I. pleonectusa* Grote. More slender in form and of a darker color. Thorax and primaries blackish olivaceous, abdomen concolorous with secondaries. Median lines trapezoidal, very nearly meeting at internal margin, even, dark, followed by a yellowish shade; orbicular subquadrate; reniform posteriorly excavate, borders concolorous with median lines; outside of t. p. line, wings a little paler, subterminal line faint, of the usual irregular shape; terminal line pale at base of fringes, bordered inwardly by a series of almost black scalloped spots; fringes blackish. Below, light ochreous, shaded with fuscous; a yellow costal apical shade. Secondaries light brown, terminal line well marked, bordered inwardly with a dark shade; beneath concolorous, with double lines faintly indicated; fringes concolorous. *Expanse* 33 m. m. *Habitat* Sharon Springs, N. Y. (O. Meske.)

I refer this species to *Ipimorpha* rather than to *Calymnia*, from the shape of the wings and an apparent indication of a thoracic tuft.

Homohadena incomitata, n. s.

In tone, color and size resembling *induta*. There is no basal dash and no markings except the median lines, which differ from *induta* in shape. They meet very nearly at internal margin. The outer line runs inwardly obliquely from its subcostal extension without being sub-medially indented opposite the basal dash, as in *induta*. The subterminal nervular dashes are sub-obsolete. The black lines are a little more broken and denticulate than in *induta*, in some specimens sub-obsolete.

Hind wings with very faint traces of the median line, which *induta* shows plainly, and is said to be absent in *retroversa* as in *kappa*. Beneath the line is fragmentary. From the fact that *induta* has a median line beneath and "*retroversa*" is said to have none, and has a basal dash on forewings and "*retroversa*" is said to have none, there is a chance that Mr. Morrison intended *incomitata*, which differs from *induta* in both these points. Mr. Morrison says, however, that he described *induta*; in this case, I think Mr. Morrison's description may with propriety be discarded from the facts in the case *Habitat*, Texas (G. W. Belfrage, No. 75.)

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CORRESPONDENCE.

DEAR SIR,—

In accordance with request in last C. E., I send you a list of some captures of Diurnal Lepidoptera, made by me in various localities :

1. Danais erippus (everywhere.)
2. Euptoieta claudia, N. Y., N. J., Oh.
3. Argynnis atlantis, Pa,
4. " bellona, N. J., Oh.
5. " myrina. N. J.
6. " idalia, Mass., N. J.
7. " cybele, Mass, N. J.
8. " aphrodite, N. J.
9. Phyciodes tharos, N. J.
10. " nycteis, Oh.
11. Vanessa interrogationis, N. Y., N. J.
12. Vanessa faunus, N. Y., N. J.
13. " comma, N. Y., N. J.
14. " progne, N. Y., N. J.
15. " antiopa, (wide.)
16. " var. album, N. J.
17. Pyrameis atalanta, N. J., N. Y., Oh.
18. Pyrameis cardui, N. J.
19. Junonia coenia, N. J., Oh.
20. Apatura idyia (clyton), N. J.
21. Lybithea motya (very rare), N. J.
22. Lycæna thoe, N. J.
23. " phleas, N. Y., N. J., Oh.
24. " comyntas, N. Y., N. J.
25. " violacea, N. Y., N. J.
26. " neglecta, N. Y., N. J.
27. Thecla damon (smilacis), Md.
28. Eurema nicippe, N. J. (rare), Md., Oh.
29. Eurema lisa, N. J., Oh., Md.
30. Pieris protodice, Pa., Md., Oh.
31. " oleracea, N. Y.
32. " rapae, N. Y., N. J., W. Va., Oh.
33. Catopsilia eubule, N. J. (rare.)
34. Meganostoma caesonia, Oh.
35. Colias philodice (wide.)
36. Papilio philenor, N. Y., N. J., Oh.
37. Papilio hesphontes, Mich.
38. " ajax, Mich., Oh.
39. " turnus, N. Y., N. J.
40. " var. glaucus, N. J.
41. " troilus, N. J.
42. " asterias, N. Y., N. J., Oh.
43. Thymele tityrus, N. Y., N. J., Oh.
44. Thorybes bathyllus, N. J.
45. " pylades, Pa.
46. Pamphila ahaton, N. Y., N. J., Oh.
47. Pamphila huron, W. Va., Md.
48. " wamsutta (wide).
49. " hobomok, N. J.
50. " massasoit, N. J.
51. Thymeticus Delaware, Pa.
52. Thecla favonius, N. Y.
53. Nisoniades brizo, Mass., N. J.
54. " catullus, N. Y., N. J.

The localities of the above species (captured by myself) may be relied on.

W. V. ANDREWS.

36 Bœrum Place, Brooklyn, N. Y., June 2nd, 1875.

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DEAR SIR,—

As long ago as August 13th, 1829, Hentz, writing to Harris, notices the fact that *Megacephala (Tetracha) Virginica* and *Carolina*, although externally like *Cicindelæ*, have the habits of the *Carabidæ*. May I ask if any good reason can be assigned why this genus should not be placed after *Cicindela* and not before it, thus bringing it into closer proximity to the family to which it seems to be most closely allied? See Harris cor., p. 77 and 78.

W. V. ANDREWS.

New York. March 29th, 1875.

DEAR SIR,—

I venture to suggest an improvement in Mr. Chase's "Cyanide Box," as described in your May No.

For reasons obvious enough to the chemist, the plan of dissolving the Cyanide of Potassium in water is not so good as that of pounding it and intimately mixing it with the Plaster of Paris, the water being unable to take up but a comparatively small quantity of the Cyanide. On page 208 of your fifth volume I gave a good recipe for making a collecting box.

W. V. ANDREWS.

36, Boerum Place, Brooklyn, N. Y., June 21st, 1875.

DEAR SIR,—

In number 12 of Mr. Strecker's work, it is claimed that his number 11 was printed in "August, 1874." I have before drawn attention to the fact that I can find no record of the issue of any nnmber of this part before November. The point is raised on account of the publication by myself of three species of Catocala in the Trans. Am. Ent. Soc. for September, 1874, claimed to be superseded by Mr. Strecker's notice of the same species in "August." I am of the opinion that a work published privately and irregularly by an author should not take precedence over one published by a Scientific Society, on testimony consisting of the mere assertion of the interested author. It is possible that persons who live nearer Reading than I do may be in possession of facts which will show that none of Mr. Strecker's dates are reliable. For myself I think they are not accurate from a variety of circumstantial evidence. In one case a species is described under a date apparently before it could have been received by Mr. Strecker. I should have been glad to have noticed that Mr. Strecker had added his synonyms of *C. illecta* Walk. (= *C. magdalena* Strecker) and *C. nuptialis* Walk (= *C. myrrha* Strecker) to his other corrections.

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In his disquisition on *Samia columbia*, Mr. Strecker thinks Dr. Hagen's suggestion might be true as to its being a hybrid between *promethea* and *cecropia*, were it not that *promethea* does not occur at Montreal. He has been already corrected on this point in the CANADIAN ENTOMOLOGIST; there is also the fact that *columbia* is described originally from Maine. The fact that *Gloveri* is suggested by Dr. Hagen to be = *columbia*, is also sagaciously left out of sight by Mr. Strecker.

With reference to *Californica*, Mr. Strecker does not know my paper published in the Trans. of the American Philosophical Society, Nov., 1874, or chooses to ignore it. His ignorance as to where *Californica* is described shows an unacquaintance even with the publications of the Entomological Society of Philadelphia, and I have shown that the synonymy in his work is copied from catalogues, etc., and is no proof of bibliographical knowledge, and therefore quite superfluous. And while Mr. Strecker very properly quotes Mr. Kirby's correction of my generic name, he purposely ignores the fact that Mr. Kirby retains for the species from the West the name *Samia Californica*, to which I believe it to be justly entitled, although Mr. Strecker calls it "*Euryalus*."

A. R. GROTE.

DEAR SIR,—

In the "Preliminary List of the Noctuidæ of California," CAN. ENT., 7, 68, I have cited a species under the number 107 with the name *Agrotis excellens*. This name is used by Dr. Staudinger for a different species previously, and may be changed for the Californian species to that of *Agrotis perexcellens*.

A. R. GROTE.

INSECT CAPTURES.

In our issue for July, 1874, p. 140, we noticed some rare and interesting captures made by one of our members, Mr. F. C. Lowe, of Dunnville, Ont., during a tour made by him in the county of Essex. At that time, when near the village of North Ridge, he secured a very handsome and perfect specimen of *Papilio marcellus* (the second recorded specimen taken in Canada), and saw on the wing two others which he did not succeed in capturing: besides which, he took several specimens of *Papilio thoas*, a species also extremely rare in Canada. These, with many others, were taken between the 10th and 20th of June.

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This year, Mr. Lowe revisited the same locality, occupying the time between the 6th and 30th of June in exploring that district, with the view of securing further specimens of *marcellus*. In this respect his zealous and praiseworthy efforts have not been crowned with success; not a single *marcellus* was seen during the whole period; probably the chrysalids had perished in consequence of the severity of the past winter. Several *Papilio thoas* were seen, but none taken.

Among his captures we observed two handsome examples of *Limenitis ursula;* also, fine specimens of *Papilio troilus* and *asterias*, *Eudamus tityrus*, *Neonympha eurytris*, *Hesp, oileus*, *Alypia Langtonii*, *Spilosoma collaris* Fitch (said to be a variety of *Euchetes egle*), *Baptria albovittatta* and several other species which we were unable to determine. There were also several handsome Diptera and Hymenoptera.

Among the Coleoptera was a female specimen of *Phanaeus carnifex*, captured near Windsor, an insect, so far as we know, never before taken in Canada; also, good examples of the following species: *Trichius bidens*, *Desmocerus palliatus*, *Clytus speciosus*, *Ædilus obsoletus*, *Cetonia fulgida*, *Cotalpa lanigera*, *Necrophorus Americanus*, *Callandra pertinax*, several handsome Curculios new to us, besides a number of other species less noteworthy.

BOOK NOTICES.

FIELD AND FOREST.—We have received the first two numbers of this new periodical, devoted to general Natural History, to which we tender a cordial welcome. It is an eight-paged monthly, uniform in size with our own journal, in every respect well got up, and containing many things to interest the Entomologist, the Botanist and general Naturalist. It is edited by our esteemed friend, Chas. R. Dodge, of the Agricultural Department, Washington. While this serial is to be devoted to Natural History in general, it will also be the Bulletin of the Potomac-side Naturalists' Club of the District of Columbia. Under the control of such an energetic and pains-taking man as we know the editor to be, we doubt not but that this journal will prosper, and be the means of furthering the interest of many departments of natural science. We sincerely wish it long life, and commend it to our readers. It is published at one dollar per annum; address—Editor "Field and Forest," P. O. Box 273, Washington, D. C.

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The Canadian Entomologist.

VOL. VII. LONDON, ONT., AUGUST, 1875. No. 8

ON SOME OF OUR COMMON INSECTS.

THE LUNA MOTH—Actias luna Linn.

BY R. V. ROGERS, KINGSTON, ONT.

If any of the insect host is a proof of high art in nature, and of the beauty of the Creator's thoughts, it is most assuredly the fair creature whose name is mentioned above. Allied to families whose members are among the greatest of the insect world, and having cousins and connections surpassing in size and beauty all others of their kingdom in this Dominion, still this moth is as pre-eminent above its fellows as is its namesake—the fair empress of the sky—above the lesser lights that rule the night.

So conspicuous is the Luna in her royal robes that she has a right to feel slighted at being thus long almost unnoticed in the pages of the ENTOMOLOGIST, and now it is hard upon her to be described among "Some of our Common Insects;" but blue blood always tells, and queenly grace and beauty will ever distinguish the Luna from among the *profanum vulgus* of the Articulata.

And now for a biographical sketch of this beauty from the cradle to the grave, and beyond that, after it assumes the resurrection attire, to that day when, its work accomplished, it lays itself down that its body may mingle again with its parent dust.

The head of the caterpillar is nearly elliptical in shape, and of a pearl color; the rest is of a delicate pale and very clear bluish-green color. A very pale yellow stripe extends along each side of the body, from the first to the tenth segment, just below the line of the spiracles; and the back is crossed, between the rings, by narrow transverse lines of the same color. After the manner of its kith and kin, each segment is adorned with small pearly warts—tinged with purple—five or six in number, each furnished with a few little hairs. At the end of the tail are three brown spots, edged above with yellow.

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When at rest, this magnificent caterpillar (which, by the way, is very similar to that of its congener, *Telea polyphemus*, save that the latter is destitute of the lateral yellow stripe, and the bands between the segments, the tail being bordered by a brown V-shaped mark) is nearly as thick as a man's thumb; its rings being bunched and body shortened, the length is only about two inches, but when it sets out on its travels, it stretches itself to about three inches. In the CAN. ENT. (vol. 6, p. 86) Mr. Gentry describes an interesting variety in which the general color is a dull reddish brown; the lateral and transverse stripes of yellow have vanished, the abdominal spots shine conspicuously, but without the yellow edging; the pearl colored warts with their purple edge have, however, assumed a richer hue, and blaze like a coronet of rubies.

When the larva has passed its allotted days in eating the leaves of the hickory, beech, oak, or walnut, and is thinking seriously of preparing its silken shroud and the casket in which it is to lie until its resurrection morn, it casts about and draws together two or three leaves of a tree, and within this hollow spins an oval and very close and strong cocoon of whitish silk. It is about 1¾ inches in length, of a chestnut brown on the outside; very thin, and frequently rough on the surface; covered with warts and excresences, but seldom showing the print of leaves. Harris says that the cocoons are formed on the trees, and that they fall to earth with the leaves shaken off by autumnal gales; but other observers assert that the larva crawls to the ground just before its change, and there prepares for its future transformations.

In this state, too, the Luna greatly resembles the Polyphemus, and many a collector having—after careful searching—got together a fair supply of what he deems Luna chrysalids, is greatly chagrined by finding dusky, one-eyed, giant Polyphemi issue from the silken tombs, instead of a bright throng of empresses of the night in their delicate bridal attire. The Polyphemus cocoons are, however, white or dirty white; rather smaller than the Lunas, with rounded ends; sometimes angular, because of leaves moulded unevenly into the surface, and generally coated with a white powder.

About the month of June the Lunas awake from their long and death-like sleep, burst asunder their cerements—having first loosened the compact threads by ejecting a liquid—and issue forth in all their glory, no more to be mistaken for the sober one-eyed Cyclopeans, but resplendent in gay attire. The wings, which expand from 4¾ to 5½

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inches, are of a delicate light green color, and the hinder ones are each prolonged into a tail of an inch and a half or more in length, longer, indeed, than those of the day-flying Papilios. Along the front edge of the fore wings is a broad purple-brown stripe, extending also across the thorax, and sending backwards a little branch to a glittering, eye-like spot near the middle of the wing. These eyes (of which there is one on each of the wings) are transparent in the centre, and encircled by rings of white, yellow, blue and black. The hinder borders are more or less edged with purple brown. All the nervures are very distinct and pale brown. Near the body the wings are densely covered with hairs. The under sides are similar to the upper, except that an indistinct undulating line runs along the margin of both wings.

As for the body that bears these lovely appendages, the thorax is white, sometimes yellowish or greenish, crossed by the purple-brown stripe that traverses the whole length of the upper edge of the front wings; the abdomen is of the same color as the thorax, and covered with white hairs like wool. The head is white and small, and adorned with wide, flat and strongly pectinated antennae of a brownish tinge. The legs are purple-brown.

Such is Luna in her various transformations to outward appearance; notwithstanding her size and loveliness, her habits and peculiar instincts are not very noteworthy. The gift of superior beauty, as among the highest of animals so in the insect world, is not frequently accompanied by remarkable intelligence or superior sense; and the most gaudy butterfly or moth is a fool in comparison with the dingy-colored bee. The caterpillars of butterflies and moths have some various instincts—chiefly in the direction of silk spinning and sepulchre building—but the perfect insects only live "to increase and multiply their race, and embellish nature. Their existence in the perfect state is usually very brief; it is one of the prettiest of honeymoons, and often love subdues and destroys every other passion. The gourmandizing caterpillar is never troubled by the ardent flame which consumes even the thought of sipping the nectar of the flowers that rival in beauty the wings of the perfect representation of elegance and love. The early insect lives and eats, and the perfect form lives and dies."

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DESCRIPTION OF A NEW CALIFORNIAN AGROTIS.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

Agrotis observabilis, n. s.

♀. Fore tibiae unarmed; middle and hind tibiae spinose. By the flattened abdomen allied to *cupidissima*. Fore wings dark blackish brown, with the terminal space paler, somewhat olivaceous. As in *exsertistigma*, the orbicular is open, triangulate, broadly pale margined, fusing superiorly with a pale subcostal shade extending from the base of the wing above this spot. Unlike *exsertistigma*, the orbicular and reniform are black, the ground color of the median space about them being powdered with deep yellow. A black basal dash before the geminate, waved, t. a. line; the latter interrupted by the subcostal shade and with an interior pale shading. Claviform moderate, pale-edged. T. p. geminate, the inner line scalloped, the outer even, enclosing a rather broad pale space; the line is very slightly sinuate, not depressed opposite the cell. Subterminal line nearly straight, dark, with a very pale powdery exterior shade. Subterminal space darker shaded on costa, relieving the costal dots distinctly. Terminal line dentate. Hind wings dark fuscous with pale interlined fringes. Beneath quite pale, faintly ruddy and subirrorate, with common exterior line fading towards internal margins and discal marks. Collar pale, edged behind with black; tegulae blackish. *Expanse* 35 m. m. Hab. California (Behrens, No. 376.)

TINEINA FROM CANADA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from p. 128.)

Argyresthia Goedartella Auct.

This beautiful and well known European insect is now for the first time discovered in this country. I quote Mr. Stainton's description from *Ins. Brit., v. 3, p. 187.* "Head yellowish white. Face and palpi white. Antennæ white, annulate with fuscous. Anterior wings white, sometimes suffused with golden, with an oblique golden fascia from the base of the

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costa; a golden fascia in the middle, furcate on the costa, one arm reaching the costa before the middle, the other a little before the apex; between them are generally a few golden spots on the costa; *beyond is another golden fascia, which, indeed, occupies the whole apex except a small white spot on each margin. Ciliæ pale grayish brown.*" (The italics are mine.) " Posterior wing gray with paler ciliæ. (The anterior wings are sometimes so much suffused with pale golden that the markings are almost obliterated.) Common among Birches in June and July. The larva feeds under the bark and in the young shoots of the Birch in March and April. *Al. ex.* 6 lines."

The single specimen before me is silvery white and the fasciæ are brown, golden, or topaz red with golden, according to the direction of the light. In lieu of that part of Mr. Stainton's description which I have italicised, I would say that in the apical part of the wing is an oblique broad fascia, nearest to the apex on the costal margin, where it contains a white streak, and it sends a branch to the dorsal ciliae so as to enclose a white spot at their base. Behind this fascia a narrow curved white one crosses the wing, and at the apex is a golden spot. It is a more handsome species than *A. andereggiella*, next after which as to beauty I would place *A. visaliella* Cham. *A. undulatella* Cham. and *A. Belangerella*, described below, are plain species.

The following are new species:

Argyresthia Belangerella. N. sp.

Head, antennae and palpi white, except that the antennae are annulate with dark brown and the face is a little suffused with yellow. Thorax on top and dorsal margin of the wings beneath the fold white, extending nearly to the tip. The other portions of the wings and sides of the thorax above them grayish brown. The grayish brown hue crosses the fold a little in the basal part of the wing, and the white crosses it a little at the base of the dorsal ciliae. There is a distinct dark brown dorsal spot just beyond the middle, but it does not entirely interrupt or cross the white part, and there are two smaller brown spots on the fold, near to and just behind it. There is also a somewhat indistinct brown spot about the middle of the costal margin, behind which and extending to the apex, at the base of the costal ciliae, is a row of alternate white and dark brown spots, and there are two brown spots within the dorsal ciliae in that part of the white which crosses the fold as above stated

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There are also a few small white spots near the apex. Ciliae grayish streaked at the apex with brown. Legs yellowish white, the anterior pair brown on their anterior surfaces. *Al. ex.* ½ inch. Its nearest known American congener is *A. undulatella* Cham., but it is closely related to such European species as *A. spiniella* Zell. This collection also contains another species, marked No. 54, but too much injured to be recognized or described.

Bucculatrix Canadensisella. N. sp.

The ornamentation of this species differs from that of any other yet found in this country, and though allied to *B. cidarella* of Europe, it is still quite distinct.

Head white. Tuft tipped with dark reddish brown, and the face faintly tinged with purplish fuscous. Upper surface of the thorax brown margined all around by white. Base of the fore wings white, followed by an oblique brown fascia, which is nearest the base on the costal margin, and is followed by an oblique parallel white fascia; all of these are placed before the middle and are followed by a large brown patch which occupies the entire wing to the ciliae, except that it contains a white spot on the middle of the costal margin. The brown patch is margined before on the dorsal margin of the wing by a small tuft of raised brown scales. At the beginning of the dorsal ciliae is a white spot placed a little before, but becomes almost confluent with a longer white costal streak. Behind these streaks to the apex the wing is pale brown, with a darker velvety brown apical spot. Ciliae pale yellowish, with a dark brown hinder marginal line before their middle, not extending into the costal ciliae. Hind wings pale fuscous. *Al. ex.* ⅜ inch.

Gracilaria pulchella. N. sp.

The palpi in the single specimen of this species in the collection are broken off. Antennae dusky yellow, faintly annulate with brown. Head yellowish, with faint violet reflections. There is no trace of the costal triangle, nor, indeed, of any markings on the fore wings, which, and the thorax, are reddish yellow, or perhaps, more properly, are very pale or yellowish brick red, with strong violet and purple reflections, especially towards the apex of the fore wings. Hind wings grayish fuscous; abdomen grayish fuscous, with the tip pale yellow. Tarsi of the 1st and 2nd pairs of legs white, with the 1st pair of legs brownish red. The under surface of the thorax and the 2nd and 3rd pairs of legs dark gray, with the tibiae and tarsi of the 3rd pair yellowish. *Al. ex.* ½ inch.

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Elachista unifasciella. N. sp.

Antennae brownish purple; palpi white. Head, thorax and fore wings brownish purple, in some lights reddish purple. There is an oblique white fascia just before the middle of the fore wings, which is a little nearer the base on the costal than on the dorsal margin, and the color of the wing is much deeper behind the wing than before it. There is a small white spot just before the dorsal ciliae, and a little behind it is a narrow costal white streak, which passes obliquely backwards nearly across the wing. The legs and tarsi are marked with brownish purple and yellowish white bands and spots. *Al. ex.* ¼ inch. The white markings on the wings are metallic in some lights. I think it is not likely to be mistaken for any known species.

Anarsia? albapulvella. N. sp.

I have but a single specimen of this species, and have not examined the neuration. Possibly it belongs to *Ypsolophus*, to which it is allied by the ciliation of the antennae, apparent under the lens. But the ornamentation is unlike that of any *Ypsolophus* known to me, and the width and form of the wings and form of the palpi ally it to *Anarsia* rather than to *Ypsolophus*. The checkered ornamentation of the antennae reminds one of a *Plutella*.

Antennae dark brown, with a white spot on each side of each joint. Palpi dark brown, the tuft tipped with white, with a white line on each side of each joint. Tongue white. Head grayish brown. Fore wings and thorax brown, the wings sparsely but distinctly dusted with white, especially towards the apex, where there is a white dusted fascia which is strongly angulated posteriorly, following the course of the apical margin and connecting a small ochreous spot at the beginning of the costal ciliae with one at the beginning of the dorsal ciliae; there are six transversely oblique oblong narrow white spots around the base of the ciliae, two of them being on the costal and four on the dorsal margin. Ciliae ochreous. Posterior wings gray, with whitish ciliae. Legs and tarsi dark brown, the tarsi annulate with white. *Al. ex.* ⅜ inch.

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ON TWO NEW SPECIES OF HOMOPTERA.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Homoptera uniformis, nov. sp.

Expanse 40 m. m. Length of body, 18 m. m.

Palpi long and slender, the second joint light and contrasting, the third dark, tipped with light. Thorax as usual in the genus. Abdomen cylindrical, with slight white dorsal tufts. Anterior wings uniform dull gray-brown, sprinkled with black atoms; the usual black clear-cut transverse lines are obsolete, the subterminal line only is seen as a black diffuse shade crossing the wings; some basal black markings; ordinary spots black, very distinct, close together; the orbicular a round spot, the reniform a sublunate black mark; a series of black dots before the concolorous fringe.

Posterior wings concolorous with the anteriors, having the same diffuse subterminal band, which, however, becomes condensed into a black spot at the anal angle. Beneath gray, concolorous, without lines; distinct black discal dots and a series of bicolorous white and black dots before the fringe.

Hab. Georgia.

Received from my friend, Mr. George W. Peck, of Brooklyn. The absence of the usual markings will distinguish this species, which does not differ structurally from the other *Homopteræ*.

Homoptera cinerea, nov. sp.

Expanse, 45 m. m. Length of body, 20 m. m.

Palpi gray, of normal form. Collar, thorax and abdomen cinereous black. Pterygodes well marked. Abdomen strongly tufted, the two anal segments ochreous, very distinctly so beneath. Both wings shining, cinereous, on a black ground; the outer half of the wings have a slight purple tinge in certain lights; orbicular spot a black dot; median shade well marked, angulate on the median vein, followed by a blackish, less cinereous shade; exterior line black, indistinct, preceded by a cinereous shade line, twice angulate opposite the brown diffuse reniform spot; subterminal line distinct inferiorly only; a yellow brown shade along the costa of the posterior wings; the disk of the wings is occupied by

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alternating cinereous and blackish shades, the former predominating; one distinct black median line, preceded by a blackish shade. Beneath uniform cinereous gray, discal dots not prominent.

Hab. Massachusetts.

The beautiful cinereous and black coloration of this fine species will at once separate it.

NOTES ON THE LIFE HISTORY OF THE AMERICAN TIGER MOTH.

BY ROBERT BUNKER, ROCHESTER, N.Y.

Arctia Americana.

Egg spherical, .04 inch in diameter, honey yellow, shiny and smooth as polished glass; laid in straight rows. Larva, when first hatched, one-eighth of an inch long, head small and black, body dark brown clothed with ten longitudinal rows of bunches of spreading hairs; dark brown on the sides, dark gray on the back. First moult somewhat increased in size, color unchanged. Second moult ⅜ inch long, dark sooty brown; hair dark brown on the sides, grayish brown above. Third moult ¾ inch long; hair on the sides and fore part above, reddish brown; light gray on the back.

Hybernated Sept. 16th. June 1st, 1875, fourth moult; 1¼ inches long; body blackish brown, sides and fore part above clothed with ochre yellow, back with long bluish gray hairs. Fifth moult—body two inches long, velvety black, ornamented above with four rows of very long bluish gray hairs (directed backwards); in front and on the sides with dark yellowish-red hair, except the third row, which is made up of about equal parts of red and gray hairs; hairs immediately back of the head short and directed forward. Spiracles yellowish white, with a waxy lustre. Feet dark, snuff brown.

Cocoon thin and loosely put together, with hair from the body woven in.

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Three specimens of this rare species were captured here last season. The one that came into my possession was brought by a friend, and laid about fifty eggs while in the box. With all the care I could bestow upon them only two reached maturity. A large majority perished during hybernation. Several sickened and died after the last moult; probably in a state of nature not more than two per cent would reach the imago state.

NOTES ON BUTTERFLIES.

BY W. H. EDWARDS, COALBURGH, W. VA.

I am able to complete the history of *M. phaeton*, part of which I communicated to the CAN. ENT. in Jan'y, 1869, vol. 1, p. 59.

The eggs are laid in large clusters of from 200 to 400 each, upon the under side of leaves of *Chelone glabra*. They are sub-conical, truncated, ribbed on upper half, yellow when laid, but soon turn to crimson. In 19 or 20 days, as Mr. Scudder informs me, they hatch. As the eggs found by me (13th June) had been deposited some days, I could not verify that point. The young larvae at once begin to construct a web, usually on the topmost leaves of the stem, and feed on the green leaves enclosed; as these are consumed, the web is extended down the stem, covering fresh leaves. The first moult takes place at six days, and the second at about the same time from the first. The third at a further interval of nine to ten days. Between the first and third the larvæ live much outside of the web, but the moult takes place within. Before the third moult a substantial web is constructed, and after the larvae have passed this moult, they become lethargic, and so remain till early the following spring. This period of lethargy commences, at this place, about the 15th of July. The web last constructed is often upon a different plant from that on which the larvæ feed, and in nearly all cases is supported by adjoining stems being incorporated.

With the first warm days of April the larvæ leave the web and scatter about the swamp in search of the young stems of *Chelone*. They moult twice and reach maturity about the 5th of May. The chrysalis period is

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from 14 to 18 days. I have found no evidence that these larvæ feed on any other plant than *Chelone glabra*, though, as I have said, the webs are built on other plants.

Phyciodes nycteis Doubleday.

I have sometimes confounded this species with *P. Harrisii*, and I see that in vol. iv, CAN. ENT., p. 237, I made this error. The larvæ of *nycteis* feed on *Actinomeris squarrosa*, as was correctly stated by me in vol. v, p. 224. I then described the fall brood of *nycteis*, all of which hybernated after the third moult, and revived the following spring. This season I have raised an early brood from the eggs, and about one-third of the larvæ went on to chrysalis, while the remainder became lethargic after the third moult.

The chrysalis of this species varies much. Some are light-coloured, nearly white, with delicate blackish spots and fine streaks of brown over the surface; others are almost wholly black, while others again are between the two extremes. The length of the chrysalis is one-half inch, and the shape very nearly that of *phaeton*.

Argynnis idalia.

Mr. G. M. Dodge sent me last fall, from Nebraska, several eggs of this species, and I succeeded in carrying a few of the larvae through the winter, and one of them past the fifth moult, but this one died before chrysalis. The eggs are congeneric in shape with those of *cybele*, *aphrodite* and *diana*, and the larvae are of the same character as in those species. In the first two stages the larvae, indeed, are scarcely distinguishable in any respect from those of *diana*. After this, instead of the color being black or brown, as in the three species named, they are prettily ornamented with light stripes; but the spines and the arrangement of them are just as in the others. The food plant was common violet, or cultivated violets or pansies, indifferently. I raised quite a number of larvae of *cybele* last winter, and with perfect success. Instead of enclosing them in glasses, a process which proved disastrous to the *Argynnis* larvae which I attempted to raise in '73–'74, I covered the plants with wire gauze cylinders. These admitted plenty of air, and I had only to see that fresh leaves were supplied.

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LIST OF NEUROPTERA COLLECTED CHIEFLY IN THE NEIGHBOURHOOD OF LONDON, ONT.

BY THE EDITOR.

All the species named below have been submitted to Dr. H. Hagen, of Cambridge, Mass., to whose kindness we are indebted for the determination of most of them.

PERLINA.

Perla rapinsularis.
" species undetermined.
Chloroperla bilineata.
Taeniopteryx maura ?

EPHEMERINA.

Ephemera natata ; very common.
Potamanthus cupidus; not uncommon.
Hexagina bilineata.

AGRIONINA.

Calopteryx maculata ; common about damp woods in the neighbourhood of small streams.
Lestes disjuncta ? ; not uncommon.
Agrion irene ; common.

GOMPHINA.

Ophiogomphus rupinsularis ; not common.
Gomphus spicatus ; not common.
Cordulegaster maculatus.

AESCHINA.

Aeschna constricta.
" verticalis.
" vinosa.

LIBELLULINA.

Celithemis eliza ; rare.
Plathemis trimaculata ; common.
Libellula quadrimaculata ; rare.
" exusta ; rare.
" pulchella.
" basalis ; rare.
" julia.

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Leucorhinia frigida ; not common.
" intacta ; not common.
Diplax obtrusa ; common.
" vicina ; not uncommon.
" scotica.
Nannophya bella ; common.

SIALINA.

Sialis infumata.
Chauliodes pectinicornis ; not uncommon.
" serricornis ; rare.
Corydalis cornuta ; not uncommon.

HEMEROBINA.

Hemerobius tutatrix.
" simulans.
Polystoechotes punctatus ; very common.
Chrysopa oculata.
" externa ?

PHRYGANINA.

Neuronia ocelligera ; not common.
" postica ; not common.
Limnophilus stigma.
Setodes ; spec. und.
Hydropsyche scalaris ?

In addition to the above, Dr. Hagen has kindly supplied us with the following list of species found in Canada.

Ophiogomphus colubrinus ; Quebec.
Gomphus parvulus ; Nova Scotia.
Hagenius brevistylus ; Ottawa.
Cordulegaster Sayi ; Quebec.
Aeschna septentrionalis ; Nova Scotia.
Epophthalmia tenebrosa ; Nova Scotia.
" elongata ; Nova Scotia.
" torripata ; Nova Scotia.
Cordulia libera ; Canada.
" Shurtleffii ; Nova Scotia.
" spinigera ; Canada.
" semiaguea ; Nova Scotia.

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Leucorhinia Hudsonica; New Brunswick.

Aeschna constricta, recorded in the Ontario list, is also found in Nova Scotia.

The above brief list of 43 species from Ontario and 13 from other portions of Canada, embraces, we believe, all that are known to occur in our Dominion. In view of the great number of insects belonging to this interesting order which occur throughout Canada, we hope that some of our collectors will devote a portion of their leisure moments towards more thoroughly working up this long neglected order of insects.

DESCRIPTION OF PACHNOBIA ORILLIANA.

BY AUG. R. GROTE, A. M.,

Director of the Museum, Buffalo Society Natural Sciences.

Both sexes of a species of *Pachnobia* have been collected by Mr. Geo. Norman, at Orillia, which I propose to call by the name of *orilliana*. It is evidently allied to *Agrotis hyperborea*, which I know only from Milliére's and Herrich-Schaeffer's illustrations. It looks at first sight like a species of *Graphiphora (Taeniocampa)*.

All the tibiae are spinose. The head is sunken, eyes naked, abdomen short. The wings are wide, the male antennae shortly pectinate, setose. The color is not unlike that of *Graph. incerta*, but more olivaceous. There is no basal dash. The color is paler, carneous gray, like the thorax, to the angulated median shade, beyond which the median space is olivaceous brown. The orbicular is large, spherical, concolorous, with a central brown dot and a brown ring. The claviform is suffused with deep brown, prominent, attaining the median shade. The reniform lies in the deeper color of the median space posteriorly, concolorous, kidney-shaped, darker stained inferiorly, well sized. The t. a. line is outwardly oblique, thrice waved, brown. The t. p. line is obsoletely geminate, the pale interior shade showing, of the usual shape, succeeded by a pale shading on the subterminal space which intrudes on the deep brown ground color outwardly like a finger below costal region. The deep brown color of the s. t. space shows the costal dots plainly and extends downwardly narrowly within and along the s. t. line, outside of the pale

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shade which follows the t. p. line. S. t. line whitish gray, broad, distinct, with a subcostal dentation else continuous and even. Terminal space blackish; broken black points indicate the terminal line. Fringes reddish brown. All the veins marked by blackish scales, and there is a blackish shading over the median space anteriorly, below median vein and on the inferior portion of the basal field. The male has the lines and spots less obvious and the shading of the wing more strongly contrasts. Hind wings with reddish brown fringes, shaded with fuscous and with a blackish exterior shade and faint median line. Beneath the wings are irrorate with rufous; on both pair the terminal spaces are contrasted by a whitish coloring. A common subterminal shade and exterior line; discal marks linear, luniform. Beneath the vestiture is reddish brown, as are the sides of the palpi; above, with the front, these latter are pale. *Expanse* 35 m. m.

In the male the conformation of the subterminal pale shading is indistinct; the blackish shading basally on interior margin is restricted, the claviform is shorter, not attaining the median shade; the dark olive brown tint of the s. t. space forms a spot along the s. t. line opposite the cell. In this species the form of the thorax, which is darker colored posteriorly, recalls that in *Lithophane.*

Lederer only gives armature to the middle and hind tibiae in his diagnosis of *Pachnobia.* *P. carnea*, the type, has all the tibiae spinose; so has *Pachn. scropulana (Agrotis scropulana* Morr.) The species have the habitus of *Graphiphora (Taeniocampa).* I find that none of the characters given by Mr. Morrison in a recent number of *Psyche*, to distinguish his *Agrotis scropulaua*, are valid, except that of the basal markings of the primaries, to which I am the first to draw attention. I am therefore still of the opinion that it is not certain that the White Mountain species is really different. I have recently re-examined my type of *Matuta Catharina.* I believe it to be a female; the simple antennae may not distinguish it from *Pachnobia* in this event, but it is different by the unarmed fore tibiae. It has a resemblance to *Pachn. orilliana* in habit and the black stains on the veins. Our North American species of *Pachnobia* will be as follows:

Cornuta Grote,
Scropulana (Morr.)
(An spec. seq. ?)
Carnea (Thunb.)
Orilliana Grote.

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INSECTS OF THE NORTHERN PARTS OF BRITISH AMERICA.

COMPILED BY REV. C. J. S. BETHUNE, M. A.

From Kirby's Fauna Boreali-Americana : Insecta.

(Continued from Vol. vii, p. 118.)

COLEOPTERA.

By an unfortunate oversight, descriptions of the following Coleoptera have been ommitted. They should have preceded the family Cleridae on p. 109 of the present volume. In the reprint which we are preparing they will appear in their proper place.—ED. C. E.

[240.] FAMILY DIRCÆIDÆ.

326. XYLITA BUPRESTOIDES *Payk.*—Length of body 3 lines. Taken in Canada by Dr. Bigsby.

Body narrow, black-brown, very minutely and thickly punctured, sprinkled with short decumbent pale hairs, not glossy. Head inserted; eyes hemispherical; palpi rufous; antennae nearly as long as the prothorax, ferruginous, a little embrowned at the apex; prothorax not wider than long, anteriorly narrowest, posteriorly obsoletely trilobed; sides rounded; scutellum transverse; elytra very little wider than the prothorax; tarsi ferruginous.

[Taken by Agassiz's Expedition to Lake Superior.]

FAMILY ANTHICIDAE.

327. NOTOXUS MONODON *Fabr.*—Length of body 1⅔ line. A single specimen taken in Lat. 65°.

[241.] Body hairy with pale hairs. Head blackish; mouth, palpi, and antennae testaceous; prothorax testaceous; horn convex above, margin denticulated; elytra testaceous with a blackish band near the apex which rises upwards at the suture, and three blackish spots; two at the base, and one between the band and the apex, the last very faint; legs testaceous; postpectus and base of the abdomen embrowned; the remainder of the prone part of the body is testaceous.

[Not uncommon in Canada. Described and figured by Say (Am. Ent., i, 21, plate 10).]

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FAMILY CANTHARIDAE.

328. CANTHARIS UNICOLOR *Kirby*.—Length of body 7 lines. Taken in Canada by Dr. Bigsby.

Body black. hoary from numerous decumbent white hairs; antennae subsetaceous, a little longer than the prothorax; two first joints very long, the first curved and nearly twice the length of the second; and the second as long as the three following ones together; prothorax rather bell-shaped, channelled; wings embrowned.

[Belongs to the genus *Epicauta* Red.]

[242.] 329. MELOE IMPRESSA *Kirby*.—Length of body 5¼ lines. A single specimen taken in Lat. 65°.

Nearly related to *Meloe violacea*, but very much smaller. Body violet-coloured. Head with scattered but not large punctures; front between the antennae transversely and obtusely elevated; antennae irregular; prothorax not much narrower than the head, anteriorly rounded, posteriorly narrower and emarginate, towards the base with a deepish impression, with several scattered but not large punctures, and two little transverse oblique crescents formed of punctures; elytra wrinkled; outer claws and spurs rufo-piceous, inner claws paler.

330. MELOE NIGRA *Kirby*.—Length of body 6 lines. A single specimen taken in Lat. 65°.

Extremely similar to the preceding species, but the body is all black with no tint of violet, except the base of the antennae below the band and the tibiae and tarsi; the head and prothorax are more thickly punctured, and the claws and spurs are ferruginous.

[Previously described as *M. conferta* Say.]

[243.] FAMILY MELYRIDÆ.

331. DASYTES FOVEICOLLIS *Kirby*.—Length of body 2¾ lines. A single specimen taken in the Journey from New York to Cumberland-house.

Body somewhat hairy, underneath black and glossy; above with a blue tint. Head glossy, punctured with largish scattered punctures; front with two impressions; prothorax nearly square, with the sides a little curved, punctured at the head, with a pair of transverse anterior impres-

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sions; sides and base margined, margin reflexed; elytra less glossy than the rest of the body, minutely, but not conspicuously, punctured.

[Belongs to the family *Malachiidæ*.]

[254.] V.—HYMENOPTERA.

FAMILY CIMBICIDÆ.

351. CIMBEX FEMORATA *Linn.*—Length of body 10 lines; expansion of wings 21 lines. A single specimen taken in Lat. 65°.

♀. Body very black, hairy. Antennæ yellow, brown at the base; legs blue-black; tarsi yellow; wings hyaline with yellow nervures, brown at the tip, with a brown cloud in the middle areolet adjoining the costa.

352. TRICHIOSOMA TRIANGULUM *Kirby.*—Length of body 9 lines. A single specimen taken in Lat. 65°. Another was also sent me from Canada by Dr. Bigsby.

[255.] Body black, shining, covered with soft and woolly whitish hairs, punctured more or less. Head, excluding the mandibles, depressed, orbicular, as wide as the trunk; mandibles crossed, very sharp, black; upper lip subpentagonal, flat with a longitudinal elevation in the middle, hairs on this part black; anterior margin of the nose wavy, emarginate in the middle; antennae with the fourth, fifth, and sixth joints testaceous; three eyelets behind the antennae arranged in a triangle; eyes oval, prominent; vertex square, marked out by a ridge on each side; trunk subglobose; prothorax with a longitudinal furrow; thighs and coxae black-blue; under a strong magnifier beautifully and most minutely reticulated, which gives them a silky lustre; the rest of the leg is testaceous; the two posterior pair of thighs are thicker than the others and armed at the apex with a short tooth on each side, between which is a cavity to receive the shank when folded; tarsi with a sucker underneath at the apex of the four first joints; wings testaceous with piceous nervures, and a cloud at the tip; abdomen ferruginous with a dorsa triangular black spot, extending from the base towards the apex, but not entering the last segment; the basilar ventral segments are spotted with brown.

[Found in Canada and Colorado.]

353. TRICHIOSOMA LUCORUM *Linn.*—Length of body 7 lines; expansion of wings 15 lines. A single specimen taken in Lat. 65°.

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Body black with a very slight æneous tint; glossy, hairy with cinerascent hairs, those of the trunk long. Head orbicular, scarcely so wide as the trunk; upper lip small, convex, orbicular, punctured; antennae black; wings subhyaline with a cloud at the tip; nervures some piceous and others rufous; thighs black with a very slight tint of blue; posterior pair armed with a tooth; abdomen short, subovate, black, covered more or less with short decumbent down; black above, underneath reddish at the tail.

[256.] FAMILY TENTHREDINIDÆ.

354. ALLANTUS LEUCOSTOMA *Kirby*.—Length of body 6 lines. One specimen taken in Lat. 65°.

Body narrow, black, glossy, without hairs. Head scarcely so wide as the trunk, wedge-shaped; palpi, suborbicular upper lip, emarginate nose, and base of the mandibles, white; apex of the latter rufous; antennae a little shorter than the trunk, nine-jointed, with the third joint longer than any of the others; neck constricted; tegulae testaceous; wings subhyaline with piceous nervures; legs yellow, with the apex of the tibiae and the whole of the tarsi of the posterior legs, black; abdomen linear, acute at the anus.

This species comes near *Allantus ater*, but the mandibles are rufous at the apex; the palpi are whiter; and the legs of a different colour.

FAMILY SIRICIDÆ.

355. SIREX BIZONATUS *Stephens*.—Length of body 18 lines; expansion of wings 27 lines. Taken in Lat. 65° and in the journey from New York.

[257.] Body very black, covered with innumerable punctures from each of which proceeds a black upright hair. Head narrower than the trunk; mandibles incumbent; palpi rufo-piceous; antennae as long as the trunk, yellow; behind each eye is a large oval yellow eye-like spot perfectly naked and smooth; legs and tips of the thighs yellow; wings yellowish with dark nervures; abdomen with the second, seventh and eighth segments luteous; anal mucro linear, yellow, terminating in a point; ovipositor black.

The specimens of this species, which Mr. Stephens found near London, might probably have been imported in fir timber from Canada.

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DESCRIPTION OF A NEW SPECIES OF ANNAPHILA FROM CALIFORNIA.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Annaphila immerens, n. s.

This is perhaps the slightest species of the genus yet known.

The blackish gray fore wings show the median line distinctly; the t. p. line is incepted nearer the apex than usual, denticulate, slightly rounded opposite the cell, and unusually strongly inflected below the black mark, which denotes the reniform spot. The orbicular is a black dot. The t. p. line is bordered outwardly with a pale shade. Hind wings deep orange yellow, without dot or median line; the latter obsoletely indicated at internal margin. A very narrow terminal black line, inwardly dentate above submedian fold; fringes fuscous. Beneath orange yellow, immaculate, with narrow even blackish edging and fuscous fringes. On primaries costal traces of a transverse line. Body blackish fuscous.

Exp. 20 m. m. *Hab.* California.

BOOK NOTICES.

The Butterflies of North America, by W. H. Edwards, second series, part 3.

The third part of the second series of this superb work has reached us since our last issue. It contains five magnificent plates, figuring *Papilio zoliacon*, *Argynnis Meadii*, *Apatura celtis*, with drawings of the egg and of the larva in its various stages; *Chionobas gigas* and *Californica*, and *Lycæna regia* and *heteronea*, with accompanying descriptions and much interesting information regarding the habits of the species.

Description of a new Crustacean from the Water Lime Group at Buffalo, by Aug. R. Grote and W. H. Pitt.

We have received advanced sheets of this paper, accompanied by an excellent photograph of the interesting object of which it treats. Both will appear in No. 1, Vol. 3 of the Bulletin of the Buffalo Society of Natural Sciences.

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The Canadian Entomologist.

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NOTES UPON SOME BUTTERFLY EGGS AND LARVÆ.

BY THEODORE L. MEAD, NEW YORK.

During the past month (July) I have endeavored to obtain the eggs and larvæ of some of the butterflies common near this place (Hunter), in the Catskill Mountains, and have met with considerable success.

The most interesting discovery was that of the food plant of *Phyciodes tharos*, which had baffled all my endeavors for the past four or five years, during which time Mr. Edwards and myself have tried a great number of plants without avail.

Once, indeed, as has been recorded in a previous volume, we obtained a number of eggs from females enclosed in a glass jar with grass, but the larvæ refused to feed and died.

This summer, remembering that the congeneric *nycteis* and *Harrisii* feed on Compositæ, I prepared a large box by partly filling it with earth and transplanting into this small specimens of all the common Compositæ I could lay my hands upon. The box was covered with gauze and about a dozen ♀ *Phyciodes marcia* and *tharos* introduced. In a few days I examined the leaves and found six patches of eggs upon one of the plants, the number of eggs in a patch varying from twenty to about one hundred and fifty. The plant proved to be a species of Aster, very common here in wet places and by the roadside; no specimens are in bloom as yet (Aug. 2nd), but from the leaves I think it will prove to be *Aster Novæ-Angliæ*. No eggs were found on any of the other plants. After finding these, I transferred the females of *marcia* which still remained alive to a smaller box with living food-plants; these have now laid several more large patches of eggs.

On the 31st of July I succeeded in finding a brood of young caterpillars upon a plant of this Aster growing in a damp meadow. The larvæ feed upon the under side of the leaf in the same way as those of *nycteis*, leaving the upper surface untouched. Those of the first moult

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are merely hairy, in the second moult the spines are already distinctly seen. Around one cluster of the larvæ a green spider had drawn his net and taken up his abode among them, no doubt finding it very convenient to have his prey within such easy reach. Probably the ravages of spiders are more destructive to this species than almost any other cause, since the eggs are deposited near the ground, in places where spiders are always very numerous.

Mr. Edwards also has females of *Ph. marcia* set for eggs, and hopes to determine the relationship, if any, between this species and *tharos*.

In obtaining eggs of *Limenitis arthemis* I have also been very successful, partly, I think, on account of a method of keeping the parent butterflies in good health and spirits, devised some years ago, and which has given very satisfactory results.

A notch is cut in the side of any empty wooden box, through which a branch of willow or other appropriate food-plant is passed, care being taken to select a leafy spray so as to partially fill the box with foliage; it is then covered with gauze, tacked fast on one side and part way on the adjoining sides, that on the fourth side being held down by a piece of wood fastened to the remaining flap of gauze. This renders easy the examination of the contents at any time. Now a saucer of raw dried apples, sugared and partly filled with water, is put in and the cage is complete. Butterflies like *L. arthemis* will live in such a vivarium for two weeks and more after their capture, and appear to enjoy the food provided immensely, laying many more eggs than if enclosed in a bag and allowed to perish of hunger and thirst.

I have often captured specimens and dropped them in upon the pile of dried apples; instead of fluttering about and endeavoring to escape, they instantly unrolled their tongues and feasted for several minutes upon the repast prepared for them, without a motion of the wings.

So far, my fifteen females of *L. arthemis* have laid a very large number of eggs, probably over five hundred, and many of them are still alive. The butterflies at first observe their usual custom of depositing the eggs upon the tips of the leaves, but become reckless after a while and lay them anywhere. I counted considerably over one hundred upon the cloth covering the box.

I had the rare good fortune to catch also a female of *L. proserpina*, which has laid 31 eggs.

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By next summer Mr. Edwards and myself hope to settle the question as to the dimorphism of *L. arthemis*, by rearing the caterpillars from these eggs; as about one-twentieth of the specimens seen are *proserpina*, if we are reasonably successful in carrying them through the winter, we are sure to obtain both forms from each kind of parent, if this is really a case of dimorphism.

Two years ago I captured a specimen here, intermediate in marking between *arthemis* and *proserpina*, and this year I have taken another, but these varieties are exceedingly rare.

The period between the laying and hatching of the egg is about seven days; the young larva, as has been observed with other species of *Limenitis*, makes its way to the tip of the leaf and there eats on both sides of the midrib, usually resting on the projecting end of this. On my box I notice that where two larvæ are hatched upon one leaf, the second comer constructs a narrow perch for himself from the side of the leaf, and rests upon it. These perches are nearly a quarter of an inch long and about one-fiftieth of an inch in diameter; they are irregularly cylindrical, and composed of frass and small bits of the leaf, fastened together and covered with grayish silk.

Besides these eggs I have many of *Satyrus nephele*, and obtained a few of a small species of *Nisoniades*. The parent was too much battered and broken to be surely identified, but I believe it to be *lucilius*. The eggs were deposited on willow; they are oval and have ten strongly projecting upright ribs, these and the space between them being marked with transverse raised lines. In color the eggs are yellow, soon changing to claret-red. The young larva, soon after hatching, eats a narrow slit from the edge of the leaf inward, soon turning at an angle, and then the flap of leaf is bent over and fastened with silken cables so as to afford shelter to the caterpillar. I have sometimes found, in previous seasons, half grown larvæ of some Hesperian on the poplars and willows here, hiding between two leaves lightly fastened together, and probably this is the habit of the species in question as it grows up.

———:o:———

PIERIS RAPÆ.—This troublesome pest to the cabbage grower is rapidly spreading westward. During the past month (August) it has appeared in considerable numbers in this neighbourhood (London, Ont.,) and is fast becoming one of our commonest butterflies. Already reports are coming in from all quarters of damage done by the larvae. We hope its little parasite, *Pteromalus puparum*, will soon follow in its wake.—ED. C. E.

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THE EFFECT OF THE GLACIAL EPOCH UPON THE DISTRIBUTION OF INSECTS IN NORTH AMERICA.

BY AUG. R. GROTE, A. M.

(Read before the American Association for the Advancement of Science, at Detroit, Aug. 10th.)

From the condition of an hypothesis the glacial epoch has been elevated into that of a theory by the explanations it has afforded to a certain class of geological phenomena. The present paper endeavors to show that certain zoological facts are consistent with the presence, during past times, of a vast progressive field of ice, which, in its movement from north to south, gradually extended over large portions of the North American continent. These facts, in the present instance, are furnished by a study of our Lepidoptera, or certain kinds of butterflies and moths now inhabiting the United States and adjacent territories. Before proceeding with the subject, a brief statement of phenomena, assumed to have attended the advent of the glacial epoch, is necessary.

At the close of the Tertiary, the temperature of the earth's surface underwent a gradual change by a continuous loss of heat. The winters became longer, the summers shorter. The tops of granitic mountains in the east and west of the North American continent, now in summer time bare of snow and harboring a scanty flora and fauna, became, summer and winter, covered with congealed deposits. In time the mountain snows consolidated into glacial ice, which flowed down the ravines into the valleys. Meanwhile the northern regions of the continent, which may have inaugurated, submitted extendedly to the same phenomena. Glacial ice, first made on elevations, finally formed at, and poured over, lower levels. Glacial streams finally united to form an icy sea, whose frozen waters slowly plowed the surface of the rocks, and whose waves, in their movement from north to south, absorbed the local glacial streams in their course, and extended over all physical barriers into the Southern States and down the valley of the Mississippi. Before this frozen deluge the animals must always have retreated. The existing insects of the Pliocene must, in submitting to the change of climate which accompanied the advance of the glacier, have quitted their haunts with reluctance, and undergone a severe struggle for existence, no matter how gradually they

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had been prepared for the encounter. We may expect that multitudes of specific forms ultimately perished, of whose remains no traces have been preserved.

Such being a brief statement of the outlines of the opening of the glacial epoch, we turn to some facts offered by a study of certain of our existing species of butterflies and moths.

The tops of the White Mountains and the ranges of mountain elevations in Colorado, offer us particular kinds of insects, living in an isolated manner at the present day and confined to their respective localities. In order to find insects like them we have to explore the plains of Labrador and the northern portion of the North American continent, in regions offering analogous conditions of climate to those obtaining on the summits of these mountains. The genera *Oeneis* and *Brenthis* among the Butterflies, and *Anarta* and *Agrotis* among the Moths are represented by the same or similar species in all of the above mentioned localities. In the case of the White Mountain butterfly, *Oeneis semidea*, we have a form sustaining itself on a very limited Alpine area on the top of Mount Washington.* Although there is some doubt that precisely the same form of *Oeneis* has been discovered in Colorado, the fact remains that *Oeneis* butterflies exceedingly like it, though registered by us under different specific names, live in Labrador and Colorado. Whether the White Mountain butterfly, *Oeneis semidea*, be, as suspected by Lederer, a modification of some of the Labradorian forms of the genus, or not, the geographical distribution which its genus enjoys cannot be meaningless. The question comes up, with regard to the White Mountain butterfly, as to the manner in which this species of *Oeneis* attained its present restricted geographical area—How did the White Mountain butterfly get up the White Mountains? And it is this question that I am disposed to answer by the action attendant on the decline of the glacial epoch.

I have before briefly outlined the phenomena attendant on the advance of the ice-sheet, and I now dwell for a moment on the action which must equally be presumed to have accompanied its retirement. Many of the

* See Mr. Scudder's article in the "Geology of New Hampshire," 1, 342. Mr. Scudder first pointed out the existence of Alpine and sub-Alpine faunal belts on Mount Washington, and interestingly remarks, "that if the summit of Mount Washington were somewhat less than two thousand feet higher, it would reach the limit of perpetual snow."

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features of its advance were repeated, in reverse order, on the subsidence of the main ice-sheet or glacial sea. The local glaciers appeared again, separate from the main body of ice, and filled the valleys and the mountain ravines, thus running at variance with the main body of the glacier, being determined by local topography. A reversal of the temperature shortened the winters and lengthened the summers. Ice-loving insects, such as our White Mountain butterfly, hung on the outskirts of the main ice-sheet, where they found their fitting conditions of temperature and food. The main ice-sheet had pushed them insensibly before it, and during the continuance of the glacial epoch, the geographical distribution of the genus *Oeneis* had been changed from a high northern region to one which may well have included portions of the Southern States. And, on its decline, the ice-sheet drew them back again after itself by easy stages; yet not all of them. Some of these butterflies strayed by the way, delayed by the physical nature of the country and destined to plant colonies apart from their companions. When the main ice-sheet left the foot of the White Mountains, on its long march back to the pole, where it now seems to rest, some of these wayward, flitting, *Oeneis* butterflies were left behind. These had strayed up behind the *local* glaciers on Mount Washington and so became separate from the main body of their companions, which latter journeyed northward, following the course of the retirement of the main ice-sheet. They had found in elevation their congenial climate, and they have followed this gradually to the top of the mountain, which they have now attained and from which they cannot now retreat. Far off in Labrador the descendants of their ancestral companions fly over wide stretches of country, while they appear to be in prison on the top of a mountain. I conceive that in this way the mountains may generally have secured their alpine animals. The glacial epoch cannot strictly be said to have expired. It exists even now for high levels above the sea, while the Esquimaux finds it yet enduring in the far north. Had other conditions been favorable, we might now find Arctic man living on snow-capped mountains within the Temperate zone.

At a height of from 5,600 to 6,200 feet above the level of the sea, and a mean temperature of about 48 degrees during a short summer, the White Mountain butterflies (*Oeneis semidea*) yet enjoy a climate like that of Labrador within the limits of New Hampshire. And in the case of the moths an analogous state of things exists. The species *Anarta melanopa* is found on Mount Washington, the Rocky Mountains and Labrador. *Agrotis islandica* is found in Iceland, Labrador, the White Mountains, and, per-

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haps, in Colorado. As on islands in the air, these insects have been left by the retiring of the ice-flood during the opening of the Quarternary.

On inferior elevations, as on Mount Katahdin, in Maine, where we now find no *Oeneis* butterflies, these may formerly have existed, succumbing to a climate gradually increasing in warmth from which they had no escape; while the original colonization, in the several instances, must have always greatly depended upon local topography.

In conclusion, I have briefly endeavored to show, that the present distribution of certain insects may have been brought about by the phenomena attendant on the glacial epoch. The discussion of matters connected with this theoretic period of the earth's history still, as it now appears, brings out more and more clearly the conception of its actuality. I hope that my present statements may draw the attention of our zoologists more to the matter, seeing that we have in our own country fields for its full exploration. And I permit myself to entertain the belief that testimony as to the former existence of a long and widely spread winter of the years, is offered in evidence through the frail, brown, *Oeneis* butterflies that live on the tops of the mountains.

METHODS OF SUBDUING INSECTS INJURIOUS TO AGRICULTURE.

BY JOHN L. LECONTE, M. D., PHILADELPHIA.

(Read before the American Association for the Advancement of Science, at Detroit, Aug. 10th.)

In accordance with the predictions made at the time of its first appearance in the immediate Mississippi Valley, the Colorado potato beetle continues to extend its area of distribution. It has during the last and present seasons reached the Atlantic coast of the Middle States, and is preparing an invasion in mass of the maritime parts of New England, which will soon be overrun with the same ease with which it has conquered the Western and Middle States. Meanwhile the farmers are anxiously inquiring for means of destroying the invader. Materials destructive to the insects and said not to be injurious to the plant or the soil, have been recommended almost without number; but with the

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exception of Paris green, they have been either very insufficiently tried or found inoperative. That compound of arsenic and copper therefore remains naturally the favorite, notwithstanding its dangerous qualities and the possible deleterious effect it may produce on the fields after long use.

Entomologists and other scientific men are often asked: "Why do you not give us another remedy against this destructive insect? Are you baffled with all your boasted progress in learning by the invasion of a wretched little bug?" No, my friends, we are not baffled by the wretched little bug, but in our endeavors to teach you how to dispose of it in such a manner as to protect your crops, we are embarrassed by your own failure to grasp the magnitude of the problem which you have set us to solve. Had you indeed comprehended the warnings given by my lamented friend B. D. Walsh, on the first injurious appearance of the insect, and since repeated by many Entomologists, you would have insisted several years ago that the subject should be investigated with a power of inquiry proportioned to its importance, and you would have received such information as might with proper and well directed industry on your part have prevented much loss.

However, I do not wish now to speak of the past; it is gone and its errors cannot be undone. Let us rather enquire what shall be done in the future.

The first thing, then, is to cease calling upon science for a remedy, when science and empiricism have probably already given you many remedies, concerning the application of which I will have a word to say by-and-by. Science can help you and will help you only when you have begun to help yourselves. How, then, can we begin to help ourselves? I hear you ask. First, then, there should be a scientific commission, selected by competent scientific authority for their merit and not for their political influence. Politicians have had too much control over our agricultural interests, as you all have reason to remember with regret. This commission should be sufficiently large to subdivide the subjects committed to them in such manner as to thoroughly investigate the habits and times of appearance in different districts of the great agricultural pests, the effect upon them of all the cheaper materials which have been or may be judiciously suggested as destroying agents, and the proper times and manner of applying them. The members of the commission should also receive sufficient compensation to warrant them in giving as much time and labor to this investigation as may be required, even to the

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temporary abandonment, if necessary, of their other scientific or secular pursuits. No such task can be properly performed and completed by the solitary labors of State entomologists underpaid and overburdened with work. Only by association of several such careful observers and investigators can a worthy, useful result be obtained for the suppresion of several of the most formidable pests.

2. This information being procured, should be tabulated as far as possible, or at least reduced to a compact form for easy reference and widely published in newspapers and also in pamphlet form.

3. By the distribution of this information and by appeals through the newspapers and agricultural journals, as well as by addresses at meetings of farmers and others interested in agriculture, it must be impressed upon the public mind that all individual efforts for the suppression of these pests are frequently futile. Only combined and consentaneous action over large tracts of country will be effective.

Now, while I am prepared to believe that when these facts are made known to the farmers they will immediately see the importance of the suggestion for unanimous and simultaneous advance upon the enemy, yet without legislative aid it will be quite impossible to secure the organization requisite for an effective onslaught. It will therefore be necessary for the citizens interested to command their representatives, either in State Legislatures or in National Congress, to prepare proper laws for the destruction of these pests at stated times, to be determined and recommended by the scientific commission. These laws will be not only cheerfully obeyed by every intelligent farmer, but I know that the farmers as a class will be glad to have such laws enacted and enforced with penalties for their neglect. Those disposed to help themselves and each other can only thus be protected against an ignorant or indolent neighbor, whose thriftlessness would otherwise make of his potato patch, his cotton field or his plum orchard a nuisance nursery from which no industry could protect the surrounding farms.

Thus, then, the organization necessary for a successful campaign against our insect enemies must be authoritatively demanded by you. Under less free forms of government the plan which I have suggested would probably have long ago been perfected by the rulers. Even the fear of the extension of the Colorado potato beetle to Europe has excited in several countries almost as much discussion and confusion of counsel as an apprehended revolution.

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The fact is, that these incursions and ravages of hostile insects represent a condition of *war*. It is only by a quasi-military organization and appropriate weapons suited to the nature of the enemy that they can be conquered. Without recognition of this fact nothing can be done against them, and we must bow our heads and exclaim with the pious Mohammedan fatalist, "It is the will of God."

Three subjects yet remain to be considered—the materials to be used, the time of making the attack in force, and the weapons to be employed.

1. The materials may be either vegetable or mineral, or merely human labor intelligently and persistently applied. The latter is the only effective means of contending against some insects, but in all cases it is a necessary adjunct to the remedies used. These remedies are very numerous, and until a careful investigation is made of the large number already suggested, no proper indications can be given except that those least injurious to man should be preferred, even at greater cost of money and labor; and that those which kill the insect by contact with its body are likely to prove more effectual than those which destroy by poisoning its food. It may be here observed that the form of apparatus in these two cases must be quite different. In the latter, any contrivance which will sprinkle a fluid or dust a powder on the exposed or upper surface of the leaves will be sufficient; in the former, in which the poison kills by contact with the insect, it must be able to reach the enemy wherever sheltered.

2. The time of attack must naturally be when the enemy is least able to resist. To quote again from the excellent memoir of Motschulsky, "the most effective and at the same time the easiest mode of opposing the developement of the locusts is the crushing out of the young broods when collected in swarms in the place where they are hatched. Consequently the most important thing is to know the nesting place of these destructive pests. In order to discover them and to point out the course to be pursued * * it might be well to send skilful persons * * to make the necessary researches, and these, with the assistance of the local authorities, might seek out the places where the insects abound and establish the necessary regulations for their destruction." (l. c. p. 228.) In the case of the cotton moth it is plain that the attack should be made upon the earliest broods, which are said to appear in the extreme southern part of the conntry, and from which the migratory swarms which travel northward are supposed to be developed; also, that the attack must be directed against the caterpillars rather than the perfect insects.

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The Colorado potato beetle may also be attacked with greatest success in the larval state. The integuments are then soft, and the appetite more voracious, so that whether the poison by contact or the poison by food be used, it will have a more certain effect than upon the perfect insect, which is protected against the former by the hard chitinous surface and against the latter by preoccupation in reproductive duties.

You will be prepared to admit the importance of the recommendation above made, that the times for making the attack should be directed by the scientific commission after full examination of the habits of the insects and the dates of their appearance in their various stages of developement. These dates will vary in different districts, and without a carefully tabulated calendar of the necessary facts, no system of combined effort, such as I believe to be essential, can be planned.

The apparatus to be used must of course vary greatly with the habits of the insects to be attacked. In the case of the plum curculio canvas frames propelled on a kind of wheelbarrow, with a ram to concuss the trunk of the tree, is probably the best instrument yet devised. The insect will fall into the net when the tree is struck, and may be easily destroyed when a sufficient mass has been collected. For the cotton moth and the potato beetle the apparatus for poisoning the leaves upon which they feed may be any simple sprinkler or dusting box, according as liquid or solid poison is employed. But for direct application to the insect itself, we must use means by which a fine spray will be driven with force sufficient to envelop the whole plant, or the surface of the ground upon which the insects are assembled, in a mist of poisonous liquid. Such an instrument is the atomizer, which has the additional advantage over the sprinkler that it consumes less liquid. The first application of the atomizer for the destruction of insects was made by me several years ago, and in the *American Naturalist* for August, 1869, I published a short paper recommending its use with certain poisonous liquids for the disinfection and preservation of insect cabinets. I have seen its frequent use with great success.

When the question of locusts became of importance last year, and the Colorado potato beetle began to be very troublesome in the Atlantic States, I spoke with several commercial friends and others about the propriety of making atomizers of large size for the destruction of these pests. In consequence of delay in the measures they thought necessary to command the attention and security of a manufacturer, no progress

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has yet been made for introducing such a contrivance into general use. Meanwhile a small apparatus consisting of an atomizer, a tank of fluid supported on the back, and a pair of bellows fixed at the side of the operator, has been independently introduced by a manufacturing establishment in Philadelphia, and I have been told is somewhat of a favorite. It will doubtless be useful to a limited extent, and is not patented I believe.

For small arms, this or a somewhat larger and more complete instrument will answer, but in the war against insect pests in which I have endeavored to interest you, we must have heavy ordnance as well as weapons for hand use. Large compound atomizer tubes, with five, ten, twenty, or, in fact, an indefinite number of orifices for producing the spray, can be made, connected with large tanks of fluid and worked by a powerful current of air from a revolving fan, driven by man, horse or steam power, according to the size of the instrument. When of sufficiently large size, the machine can be mounted on wheels and transported wherever it would be required for use. Before such instruments as these an invading army of caterpillars, or even a recently hatched swarm of locusts, would be annihilated. A comparatively small number of men would be required to work a battery of this kind of field artillery, and it would be found immensely effective.

The organization recommended can be effected only by the strong appeal of the people where agricultural interests dominate, for proper instruction from the government and proper protection by legislative power. We have game laws to protect our useful wild animals; thistle laws to guard against extension of noxious weeds. Why not have insect laws for destruction of agricultural pests?

Farmers of the West, are you willing to exert yourselves to procure this result? The prize is a rich one—it is no less than immunity from an annual destruction of property quadruple or sextuple that of the great Chicago conflagration.

ON A CANADIAN SPECIES OF AGROTIS.

BY A. R. GROTE, BUFFALO, N. Y.

Mr. George Norman has sent me specimens of a species of *Agrotis* allied to *tessellata*, which were taken at Orillia. I propose to call the species *Agrotis versipellis*. The male antennae are brush-like, eyes naked,

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all the tibiae spinose. The thorax and tegulae are dark brown; collar with a blackish shade in front, below which it is ashen. Head and tips of palpi grayish brown; 2nd palpal joint outwardly blackish. Fore wings blackish brown; lines geminate, distinct, with pale included shades. *Median vein narrowly striped with white.* A whitish shade over subcostal nervure. Claviform rather small, distinctly black-edged. Stigmata smaller than in *tessellata*, grayish brown, the cell between them, and before the ovate orbicular, blackish. Median space of a clearer brown below the median vein. Course of the median lines much like *tessellata;* the t. p. a little more exserted opposite the median nervules. Subterminal line a nearly straight gray shade, thus differing decidedly from *tessellata.* Hind wings blackish fuscous, a little paler at base, with paler fringes and reflection of the discal lunule from beneath, where both wings are blackish fuscous and show a faint common line. *Expanse* 30 m. m.

This is a handsome species and seems to be easily distinguished from its ally by the white median vein. It seems intermediate between *tessellata* and *Ridingsiana.*

I have been shown in Detroit, by Mr. J. A. Lintner and Mr. O. S. Westcott, specimens of an *Agrotis* new to me, but which I thought might prove the true *obeliscoides* of Gueneé, from my memory of his description. This is in so far interesting, as I have been disposed, in the absence of another species, to consider *sexatilis* as the species intended by Gueneé.

ON CERTAIN SPECIES OF MOTHS FROM FLORIDA.

BY A. R. GROTE, BUFFALO, N. Y.

The following species were collected by Mr. Schwarz and Mr. Bela Hubbard, of the Detroit Scientific Association, among other most valuable scientific material, obtained during a recent visit to Florida.

Megathymus yuccae (Bdv. & Lec.) Scudd.

The eyes are large and naked; caputal squamation of mixed flattened scales and hair. I cannot find any ocelli. The cylindrical, scaled antennæ are capitate, without terminal inflection or hooklet. The tibiæ and tarsi are strongly spinose; hind and middle tibiæ with terminal claw. I regard the insect as belonging to the Castnians, where it is placed by Walker. The ornamentation mimics the Hesperians.

Haulover, Fla., March 8.

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Aegeria floridensis, n. s.

♂. Seems to belong to a new structural group, for which I propose the name *Pyrrhotaenia*. The antennæ are heavy, lengthily pilose, brush-like. The naked eyes are banded black and golden, narrowed superiorly. The ocelli are large. The head is narrow, prominent; palpi curved, long, ascending, free from the front; maxillæ moderate. Anterior wings scaled, very narrow, widening terminally at outer third, blackish violaceous. The narrow portion of the wing is medially orange red, interrupted by the ground color at beyond the disc. Beyond the interruption the interspaces are orange red for a short space; the internal margin to terminal third is narrowly streaked with orange red. Beneath largely shaded with orange; the violaceous terminal portion of the wing interspaceally rayed with orange. Hind wings pellucid, with narrow orange costal border and blackish fringes. Head covered with broad blackish violaceous scales antennæ violaceous. Palpi and collar orange. Legs violaceous, marked with orange; hind tibiæ twice broadly banded with orange. Abdomen blackish cyaneous, with a concolorous terminal tuft containing a few white scales; two terminal segments banded with orange, fourth from the tip orange banded, this color extending beneath.

Expanse of fore wing, 6 m. m. *Total length of body*, 9 m. m.

Enterprise, Fla., May 29.

Cosmosoma omphale Hübn.

Haulover, Fla., March 9.

Syntomeida ipomaeae Harris.

The discal dot is sometimes obsolete on the fore wings above.

Enterprise, Fla., May 28.

Didasys, n. g.

A form allied to the Cuban *Burtia*. The abdomen in the male provided with two lateral, elongate, pilose, blackish terminal tufts, one on each side, arising from the genital pieces, which latter are prominent, exceeding the anus, when closed forming a whitish U beneath, from the color of the scales. The large ocelli are removed from the somewhat narrowed, naked eyes. The plumose ♂ antennæ are thickly furnished with lengthy setose pectinations. Palpi moderate, pointed, exceeding the front. Shape of the wings as is usual in the group. The median fold of *Cosmosoma* is absent.

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Didasys Belae, n. s.

Vertex, collar, base of the primaries and palpi orange; terminal palpal joints blackish. Antennae black; legs blackish, streaked with whitish and with whitish fore coxæ. Abdomen above orange scarlet, terminal segments with short lateral fluffy tuftlets, the terminal ones touched with black. Thorax and patagia black, neatly lined with pale. Abdomen beneath orange at base, the terminal portion whitish with blackish incisures. Fore wings pellucid; veins black marked. A wide black terminal band enclosing a series of six interspaceal orange yellow spots, arranged subterminally in a series following the shape of the terminal margin. An orange yellow discal spot narrowly edged with black. Internal margin blackish, narrowly streaked with yellow. Hind wings pellucid, with black borders and the costal edge narrowly yellowish. Beneath as above, the spots of a paler orange. The ♀ has a dorsal row of abdominal black dots; anal segments terminally brownish; the dorsal abdominal markings are very slightly shown by the ♂ on close inspection.

♂, Cedar Keys, June 4, expands 26 m. m.; the two terminal tufts are 3 m. m. in length.

Dahana, n. g.*

A form between the clear-winged Glaucopid genera and *Ctenucha*. The narrow primaries are one-third longer than the entire body. Both pair of wings are closely scaled, cyaneous black terminally, but mostly dead black. Antennae long, plumosely pectinate in the male, serrate in the female. Abdomen rounded terminally, without anal tufts in the male, short in both sexes and plump. Ocelli near the margin of the narrowed naked eyes. Palpi exceeding the front.

Dahana atripennis, n. s.

Face mixed cyaneous and yellow; orbits of the eyes, palpi at base, sides of the thorax in front dark yellow; terminally the palpi are black. Thorax beneath cyaneous, brilliant; above black with yellow edges to the patagia at base and streaked with cyaneous. Abdomen brilliant blue laterally at base, else orange above in the male, yellow in the female. Fore wings dull black, slightly blue outwardly in male, with a yellow fleck above internal angle. Hind wings cyaneous black above, with short pale fringes. Beneath fore wings more blue at base, with the yellow streaky

* Sanskrit: the Dawn.

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shade at internal margin more diffuse. Hind wings immaculate beneath. Abdomen dusky along the venter.

Length of primary 18, of the body 12 m. m.

Enterprise, Fla., May 28.

The male is the more gaily colored, and has the blue reflections more noticeable.

Hexeris enhydris, n. g. et sp.

♀. There are no ocelli, and thus there is a resemblance to the Geometridae in a form resembling the Fasciatae in the long labial palpi. The cut of the wings rather resembles *Endropia.* The labial palpi are extended straightly forwards for more than twice the length of the head. The palpi are divaricate, the third joint linear, elongate, more than half the length of the second. Antennae simple, comparatively short; the genus seems distantly related to *Syllectra.* Fore wings 12 veined, no accessory cell; veins 7, 8, 9, thrown off near together from the upper extremity of the cell; cell incompletely closed; 5 nearer to 4 than to 6; 8 to apex. The position of 5 seems to me decisive, and that we have to do with a Noctuid. Hind wings 8 veined, 3 and 4 from one joint, 5 near 4; cell closed by a fold or obsolete vein; 5 hardly weaker than the rest. The divided frenulum indicates the sex of the specimen. The frenulum seems to be homologous with the marginal or sixth principal vein of butterflies. Mr. Scudder has pointed out to me that this number is sometimes present in the higher groups. The frenulum cannot be considered a specialized hair. I have before come to the conclusion that it represents a missing vein; the reason for its complexity in the female I cannot yet suggest. In the new form the legs are slender, long and unarmed. The entire insect is pale ochreous, shaded with rusty, and in color and ornamentation resembles some of the Geometridae. The fore wings have common wavy rusty lines, and are mottled or subreticulate in appearance. A median line bent at the middle of the wing, where it unites with an outer line from the costa, and thus sketching the figure of a crooked Y, is noticeable. Beneath the same markings come out, the broader rusty lines of the upper surface being reproduced on a yellowish ground. Length of fore wing 17 m. m.

Two specimens collected at Fort Capron, Fla.; the largest is before me. I am much indebted to Mr. Geo. Dimmock for his preparation of the wings of the specimen by a valuable process discovered by him, an account of which was read before the American Association for the Advancement of Science.

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MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

According to previous announcement, the first meeting of this club was held in the rooms of the Detroit Scientific Association, on the 10th of August, at 2 : 30 p. m., Dr. J. L. Leconte, President in the chair, Prof. C. V. Riley, Secretary. The attendance was large, including S. H. Scudder, Esq., Cambridge, Mass., Vice-President, and Messrs. A. R. Grote, Buffalo, N. Y., W. Saunders, London, Ont., B. P. Mann and E. P. Austin, of Cambridge, Mass., Prof. E. S. Morse, Salem, Mass., J. A. Lintner, Albany, N. Y., E. A. Schwarz, H. G. Hubbard and B. Walker, of Detroit, Dr. A. E. Dalrymple and Dr. J. G. Morris, Baltimore, Md., Prof. A. J. Cook, Lansing, Mich., Dr. Hoy, Racine, Wisconsin, Clinton Roosevelt and Geo. Dimmock, Springfield, Mass., B. D. Sanders, J. C. Holmes and Wm. Provis, Detroit, J. T. Ison, Cleveland, Ohio, and others.

President Leconte, in a few opening remarks, stated the objects had n view in the formation of this club. They were chiefly to cultivate closer personal relations among those interested in Entomological pursuits, many of whom were widely separated by distance, to exchange views and record observations, and to exhibit specimens of interest. He hoped that the meetings would not only be fruitful in these respects, but that, seeing the importance of Entomology in its relation to agriculture, some good to the country might flow from the deliberations.

Mr. Wm. Saunders mentioned the fact of the unusual scarcity of insects of the Saw-fly family (Tenthredinidæ) throughout western Ontario, especially those destructive to fruit, namine the Gooseberry Saw-fly (*Nematus ventricosus*) and the Pear Tree Slug (*Selandria cerasi*). Both these insects, although enormously abundant and destructive in 1874, had been quite scarce in 1875. He called for suggestions as to the cause, his own impression being that this diminution had been caused by the severity of the late winter and spring.

Prof. Cook, of Lansing, Mich., had not observed any remarkable scarcity of these species in his neigborhood.

Prof. Riley had remarked their almost entire absence in some localities, and their comparative abundance in others.

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Mr. A. R. Grote exhibited specimens of *Agrotis islandica* from the top of the White Mountains and from Labrador.

A lengthy discussion on nomenclature ensued, and was participated in by many of the members present, it being generally conceded that some action should be taken by the club, looking to the adoption of some rules or suggestions which might guide the Entomologists of the country on this perplexing question. On motion, Messrs. Scudder, Riley and Saunders were appointed a committee to take the matter of nomenclature into consideration and present it at a future meeting in such form as to offer opportunity for more definite discussion.

Mr. Scudder spoke favorably of *Psyche*, the organ of the Cambridge Entomological Club, and urged that members subscribe for it on account of its excellent bibliographical record.

Mr. Mann called attention to the difficulty of getting hold of State Reports, and thought there should be some system adopted by which these reports could be placed on sale, so that Entomologists who desired to do so might purchase them.

Mr. Saunders thought that if some plan couid be devised whereby the valuable facts and suggestions contained in these various reports could be brought together, condensed into one volume, and made available to agriculturists as well as entomologists, that much good would result from it.

The President suggested that such a work might well be done by the general government, and would be much more valuable than the volume it now sends out.

On motion, it was resolved that this club request the American Association for the Advancement of Science to take such action as seems best calculated to secure the placing of State Reports upon scientific subjects in the library of the Association. The Secretary was instructed to bring this subject before the Association.

Dr. Morris referred to the scarcity of Sphingidae about Baltimore during the present season, an experience which was corroborated by other members present. Mr. Austin had found all insects unusually scarce about the White Mountains, where he had been collecting for the past two years. Mr. Riley thought the very severe and late winter and the unusually rainy summer in part explained the fact.

Mr. Scudder offered some remarks on the great abundance of the Army Worm *(Leucania unipuncta)* in portions of Massachusetts, as an

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exception to the general rule of scarcity of insect life; he had made a calculation from the number counted in a square foot, that in a field near Cambridge there must have been as many as two million worms to the acre. Other members offered similar experience in reference to this species. Mr. Riley stated that the Army Worm generally abounds during a very wet summer following a very dry year.

Mr. Lintner referred to the great scarcity of *Orgyia leucostigma* as in striking contrast to its abundance last year in Albany.

The election of officers then took place, resulting in the re-election of Dr. John L. Leconte as President, Samuel H. Scudder, Vice-President, and C. V. Riley, Secretary.

Mr. Riley read a paper on "Locusts as Food," in which he gave his own experience in cooking and eating them. On one occasion he ate nothing else for a whole day. He found them to have an agreeable nutty flavor, and especially recommended them deprived of their legs and wing cases, and fried in butter, and also spoke very highly of a soup made from them. He referred to John the Baptist, who had often been pitied for the scantiness of his fare, locusts and wild honey; Mr. Riley thought he had been well provided for. The writer regarded it as absurd that parties should actually die of starvation, as some had done in the districts where this locust plague had prevailed, while surrounded by such an abundance of nutritious and palatable food.

The meeting then adjourned, subject to the call of the President.

On Tuesday evening, the Cambridge Entomological Club held a meeting, when all interested in Entomology were invited to be present. W. Saunders, of London, Ont., was called to the chair. After the usual routine business had been disposed of, Mr. George Dimmock read a paper on the recent excursion of the Cambridge Club to the White Mountains, where the members had spent some two weeks in collecting. The experiences related were of a very interesting character, showing that the party, besides accomplishing much useful work, had thoroughly enjoyed their trip. Mr. Austin, who had been one of the party, exhibited a large collection of insects made during the past two years among the White Mountains, embracing many very interesting species, and offered some remarks on their habits.

Messrs. Cook, Lintner, Morris and Riley were elected members of the Club.

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Mr. Grote presented some instructive facts in relation to the identity of some of the White Mountain moths with those of Labrador. Mr. Riley enquired whether many *Caloptenus* had been found on Mount Washington, and expressed the opinion that a race of *spretus* had been found there.

Mr. Saunders enquired of the Michigan friends whether *Pieris rapæ* had been found in the State. Prof. Cook stated that it had not yet appeared in Michigan; he remarked that *protodice* was much more numerous than *oleracea*. Mr. Riley stated that *protodice* was most abundant throughout Illinois and Missouri. Mr. Ison, of Cleveland, stated that *rapæ* appeared in his neighborhood for the first time last spring; at first it was found along the lake shore, but before the season closed it was abundant throughout the greater part of the district over which his observation had extended. Mr. Ison said that with them the larva seemed to prefer mignonette to cabbage. In reply to a question as to the correctness of the views advanced by some Entomologists in regard to the color of the imago being affected by this food plant, Mr. Lintner said that he had, from among 500 or 600 specimens fed on cabbage, found a number of the yellow variety. Mr. Riley stated that the larva of *protodice* was also partial to mignonette.

Danais archippus formed the next topic of discussion. Mr. Cook had found the larva this season peculiarly infested by several parasites. Mr. Riley had seen Tachina flies bred from *archippus*. Mr. Saunders had reared, on one occasion, a large number of small Hymenopterous parasites from a chrysalis. He also asked the members if any explanation could be given of the reason why this species assembled occasionally in immense swarms and migrated thus from place to place, and referred to instances of such swarming. Mr. Ison referred to an immense swarm which passed over Cleveland three years ago. In this instance it appeared as if they had crossed the lake from Canada: they were seen in immense numbers for three or four days. *Archippus* was said to occur in Australia, where it also occasionally swarms.

(To be concluded in our next.)

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The Canadian Entomologist.

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MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(Concluded from September No.)

References were made by Mr. Grote to several rare captures of Lepidoptera in the vicinity of Buffalo. Among others he had taken *Thecla ocellifera*, which is also found in the West Indies. Mr. Saunders stated that he had again reared a specimen of *Thecla strigosa* from thorn, and referred to the capture of specimens of *P. thoas* and *P. marcellus* at North Ridge, Ont., by Mr. F. C. Lowe, of Dunnville. Mr. Cook said that *thoas* had been found this year at Lansing, that it occurred there to his knowledge some three years ago, and that last season it was quite common, the larva feeding on prickly ash. Mr. Riley stated that the larvae of *philenor* feed on a creeping plant very closely allied to Aristolochia. Mr. Ison has found *philenor* scarce about Cleveland during the last five or six years, but *marcellus* rather common; the larva of the latter feeds on pawpaw. One of the Detroit members remarked that there were pawpaw bushes growing within a few miles of Detroit.

A discussion on sugaring for Noctuæ was next in order. Mr. Ison reported excellent success with this method at Cleveland; he preferred adding a little rum to the usual mixture of beer and molasses or coarse sugar. Mr. Lintner greatly interested the members in relating his wonderful success in sugaring. He produced a tabulated list of Noctuidæ captured or observed at sugar at Schenectady, N. Y., commencing with July 7th, giving the results of sixteen evenings in that month, and four evenings in August.

Seventy-eight species of Noctuæ are recorded, and opposite each species observed or collected is placed a check in a column bearing the day of the month at its head. Four species were observed on each evening, viz., *Hadena arctica*, *Hydroecia sera*, *Homopyralis tactus* and

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Asopia costalis. Of the first two, hundreds could have been collected on a single evening. *Hadena lignicolor* was unobserved on only one evening; *Erastria carneola* on only two evenings; *Catocala ultronia* and *Hadena devastator* on only three evenings.

The following species were common: *A. herbida, A. haruspica, A. plecta, Orthodes infirma, Pseudothyatira expultrix, Hydroecia nictitans, Amphipyra pyramidoides* and *Erastria nigritula.* Of *Catocala ultronia* about *seventy* examples in fine condition were captured; of *Catocala nuptala,* of which not a single example had ever before been taken by Mr. L., thirty-six were collected, and of *Catocala parta* sixteen examples had been secured, all in perfect condition. Specimens of *Catocala Meskei, C. serena, C. Briseis, C. Clintonii, C. polygona* and *C. similis* had also been obtained.

Mr. L. has become quite enthusiastic over the success with which he has met thus far, in the number of rare species collected, and particularly in the perfect condition in which the larger portion of them are obtained. It is his purpose to continue his collecting in this method, and also the tabulation of the results. The table, when completed at the end of the season, will probably be published in the New York State Museum Report. We are sure that it will prove a valuable contribution to that part of the natural history of our moths which relates to the number and duration of their several broods.

Mr. Mann exhibited specimens of the wood of *Agave Americanum,* which, when cut of the proper thickness, may be used as a substitute for cork. This wood is remarkably light and porous, and pins may with great ease be firmly pushed into its substance. It grows in Brazil, and can be obtained from Mr. Mann at a lower price than cork. In proof of the suitability of this material for the purpose named, Mr. Mann stated that Wallace preserved all his specimens collected in the East Indies in boxes made with pieces of this wood pinned together with thorns.

At a late hour this most enjoyable meeting was brought to a close.

On Thursday afternoon a large proportion of the members of the club joined in an excursion to some good collecting grounds in the neighborhood of Fort Wayne, the party being under the direction of Mr. Hubbard, of Detroit. A very pleasant and profitable time was thus spent, and many interesting specimens captured. In addition to the advantage enjoyed of closer social intercourse between the "brethren of the net," this occasion afforded an opportunity for the mutual exchange

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of practical ideas in regard to collecting insects which no in-door meeting could have afforded. It seemed as if every member had *some* original idea of his own either in reference to capturing or carrying specimens, the advantages of which were freely urged and as freely discussed with much profit. After thoroughly enjoying themselves for several hours, the members returned at nightfall well satisfied with the afternoon's sport.

On Friday morning a second meeting of the Entomological Club was held at the rooms of the Detroit Scientific Association. In the absence of the President, Mr. Lintner was called to the chair.

The Committee on Nomenclature reported as follows :—

" The committee appointed at the last meeting of the Entomological Club to consider whether any immediate action is advisable on the part of the club to aid in establishing uniformity in zoological nomenclature, finding that the committee of the general association intends to report during the present session, and deeming it best to await this report before making any definite proposition, would at the present time recommend that the club appoint a committee of five to prepare and present to the club at its next annual meeting a compendium of the views of the leading entomologists of the country upon points which, in their judgment, require elucidation, and also to present a series of resolutions touching such points, in order that intelligent discussion may be had upon them, and some general agreement, if possible, arrived at.

Signed, SAMUEL H. SCUDDER,
C. V. RILEY,
WM. SAUNDERS."

On motion the report was adopted, and the appointment of the committee left with the President, who subsequently nominated the following gentlemen :—Messrs. Scudder, Saunders, Grote, Riley and Leconte.

An interesting discussion then took place in reference to the various methods of pronunciation followed by entomologists when speaking of insect names, which culminated in the following resolution, which was carried unanimously.

Resolved, that in view of the desirability of securing uniformity among Entomologists in the pronunciation of the names of insects, Mr. O. S. Westcott, of Chicago, be requested to prepare such an accentuated list for publication in the CANADIAN ENTOMOLOGIST.

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Mr. Westcott very kindly promised to give his attention to this matter at an early date. We shall hail the advent of this list with much satisfaction; it is a work greatly needed, and coming from the hands of one who is in every way well fitted to do it justice, we feel sure that it will command general assent.

The next subject of discussion was on certain offensive names which have been proposed for insects, in which most of the members took part. The following resolution was unanimously adopted:—

Resolved, that in view of the fact that certain names have of late been proposed for insects which are offensive and unwarrantable, that the Committee on Nomenclature be requested to present at the meeting next year a list of such names as should be ignored, so that the club may take action in reference to them.

Some explanations were then offered in regard to a valuable discovery lately made by Mr. George Dimmock, of Springfield Mass., of a ready method of removing the scales from the wings of Lepidopterous insects, so as to display the vein structure. Mr. Dimmock had kindly shown the admirable working of his process to a number of Entomologists at his room the evening previous, when all present were struck with the great practical value of the discovery. After full explanations to those present who had not seen the working of the process, it was resolved, "That the thanks of the members of the Entomological Club be given to Mr. Dimmock for his valuable discovery in reference to a ready method of denuding the wings of insects."

This process of Mr. Dimmock's formed the subject of a paper read before the American Association, and which will be published, we believe, in an early number of *Psyche*. It may thus be briefly explained: All the materials necessary are a little alcohol, a saturated aqueous solution of chloride of lime, a phial of pure muriatic acid and another of sulphuric acid. The wings are first moistened with alcohol, then transferred to the solution of chloride of lime, to which a little of the sulphuric acid has been added. After immersion for a few moments, the coloring matter of the scales rapidly disappears. This result may be hastened by taking the wings out of the chloride of lime solution and immersing for a moment n the muriatic acid, diluted with twice its weight of water, and then returning them again to the former solution. This alternation may be repeated as often as required. By this means any quantity of wings of Lepidoptera may be safely and entirely denuded with little or no trouble.

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The denuded wings were neatly mounted by Mr. Dimmock on white cards, to which they had been gummed. An interesting collection, illustrating the nerve structure of many of the genera of moths, was exhibited by him, to the great gratification of all present.

In the compilation of these memoranda in regard to the meetings of the Entomological Club, we are greatly indebted to the Secretary, Prof. C. V. Riley, who very kindly placed his notes at our disposal; also to Mr. B. P. Mann, of Cambridge, who did us similar service.

ON CATOCALA VERRILLIANA, WITH NOTES ON CATOCALA RELICTA.

BY A. R. GROTE, BUFFALO, N. Y.

Catocala Verrilliana Grote, Bul. B. S. N. S., 3, 12 (Aug., 1875).

The smallest N. Am. red-winged species known. It has a resemblance to *polygama* and *fratercula* in the ornamentation of the primaries. Fore wings gray, shaded with blackish; lines black. A diffuse basal black shade. T. a. line diffusely shaded with black. Reniform small, yellowish, more or less distinctly double ringed. Sub-reniform small, yellowish, disconnected with the t. p. line. T. p. line shaped much as in *polygama*. Hind wings bright red. Median black band narrow, tolerably even throughout, not attaining internal margin. Terminal band black, narrow, not quite attaining anal angle. A red apical mark, opposite which the fringes are pale. Medially the black band is five times outwardly scalloped, and opposite this scalloping the fringes are blackish. The red color again prevails below them on the margin, with the pale fringes; towards anal angle the fringes are dusky. Beneath, both wings red, with constricted median band on hind wings not attaining the margin.

Expanse 48 m. m. G. W. Belfrage, Bosque Co., Texas, June 13. Dedicated to Prof. A. E. Verrill, of New Haven. Interesting as a form of the red-winged group, resembling the yellow-winged and smaller species of the genus.

I am indebted to Prof. Hopffer, of the Royal Museum of Berlin, for a beautiful water colored drawing of the Texan *Catocala frederici* Grote,

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the types of which species, from Texas, are contained in the Royal Museum.

Catocala relicta (Walk.)

I have recently examined my material of this species taken in Buffalo and Batavia, N. Y., and I find that the dark shading of the fore wings is not a sexual, but a varietal character. I have a male (as shown by the simple frenulum and the genitalia) which is darker than the specimen figured by Mr. Strecker as a female. I have also a female whiter than Mr. Strecker's figure of the male as regards the fore wings. It is evident from the form of the abdomen that both Mr. Strecker's figures are males. The sexual character is adopted from earlier writers, who had slender material, without personal verification by Mr. Strecker.

ON NEW SPECIES OF AGROTIS.

BY A. R. GROTE, BUFFALO, N. Y.

Agrotis Treati, n. s.

♂. Allied to *A. bicarnea* Guen.; smaller and distinguishable by the evenness of the t. p. line. Fore wings dead brownish black. T. a. line rigidly oblique to submedian fold, not rounded as in its ally, and with a less prominent tooth on internal margin. A very faint yellowish shading to the line and also on the costa at inception of t. p. line, where *A. bicarnea* is strongly marked with carneous. T. p. line shaped as in its ally, but even, geminate, the inner line not scalloped; the component lines include a pale shading. Disc velvety black between the narrow stigmata, which are concolorous with the dead black of the wing. A black shade at base below the median vein. All the transverse lines geminate; the inner line of the basal and t. p., and the outer line of the t. a., marked with velvety black. In one specimen there is an absence of the velvety black shades; this one is in imperfect condition and allows of no certain description. Hind wings yellowish gray, paler than in *bicarnea*, with a noticeable terminal darker shading. Beneath with common line and

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strong lunule on secondaries. Head dark brown on vertex, with pale marginal lines; terminal palpal joints pale; collar brown, with a black and pale line at base. Legs dark, pale dotted. Thorax brownish black, with pale line at base of tegulæ. Abdomen like secondaries.

Expanse 34 m. m. Mass., Mr. Thaxter, No. 2,311. Named for Mr. James O. Treat, of Andover, Mass.

Agrotis brunneipennis, n. s.

♂. Allied to *cupida*, but smaller. Fore tibiae unarmed. Thorax and fore wings of a glossy chestnut brown, somewhat reddish. None of the usual markings are noticeable. The subterminal space is stained with blackish. Following the s. t. line is a series of faint pale interspaceal fleckings. Ordinary lines indicated on costal region. Hind wings blackish fuscous. Abdomen beneath stained with reddish brown as is the costal region of primaries; else the blackish wings beneath show only a common black transverse line, which fades out towards the internal margins. Palpi black at the sides. Head brown above.

Expanse 30 m. m. Mass., Mr. Thaxter, No. 2,303.

Agrotis friabilis, n. s.

♀. A small species with a resemblance to *Bostoniensis*. All the tibiæ spinose, the fore pair with larger terminal spinules; clypeus roughened. Fore wings fuscous gray, with indistinct darker markings. The t. p. line is lunulate; the t. a. line widely geminate and dentate; stigmata obsolete; median shade noticeable; terminal space more purely gray than the rest of the wing. Hind wings concolorous, pale grayish fuscous, above without line or spot; beneath (where they are whitish with the costal region powdered with fuscous) there is a faint median shading. Fore wings beneath with a faint median line distinctly marked in black on costa.

Expanse 30 m. m. Taken by Mr. Geo. Norman; number 371.

Agrotis badicollis (Grote).

Mr. Norman sends me a fine male with the transverse lines broadly marked in black, and Mr. Lintner has again sent me my ♀ type. I have mistaken the black scales about the eyes for true lashes. Mr. Morrison's correction, as to the genus, must, then, be accepted. The species seems to vary greatly in distinctness of markings.

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Agrotis campestris Grote.

This species, collected by Mr. Geo. Norman at Orillia, No. 372, appears to be a form of *tessellata* (*maizi* Fitch); it differs by the red brown tinge of thorax and fringes, the unicolorous purplish black brown primaries, and the coarseness of the black median lines. Specimens are before me from N. Y. (Mead) and Vancouver Island (Hy. Edwards, 5,644). With other species of the genus, it is described in a paper presented to the Academy of Natural Sciences, Philadelphia.

ON A NEW CANADIAN LITHOPHANE AND SCOPELOSOMA.

BY A. R. GROTE, BUFFALO, N. Y.

Mr. George Norman has recently taken a number of the species of the genus *Lithophane* at Orillia. In a recent letter, Mr. Norman records the capture of *petulca*, *ferrealis*, *disposita*, *Bethunei*, *semiusta*, and "that lovely *oriunda*, a single specimen." Mr. Norman also finds a number of specimens of a large light grey species allied to *laticinerea*, but differing from that species and *cinerea* in the position of the stigmata, the color, and the shape of the subterminal line. I propose to call the species *Lithophane Georgii*, after its discoverer. Fore wings bluish grey, with a white shade on the shoulder above the black basal dash. T. a. line dentate, indistinct. Orbicular erect, not oblique, moderate, concolorous, with a paler annulus. In shape, color and form this spot offers decided differences when compared with allied species. Reniform squarish, darker stained than the wing, proportionally smaller than in allied forms. T. p. line sub-obsolete; it appears to run nearer the subterminal line than usual; the latter line consists of a series of disconnected, distinct, interspaceal, blackish, triangulate marks. Fringes entire, concolorous. Hind wings blackish fuscous, beneath with spot and line. Thorax concolorous with primaries; collar with a black line in front; face with a black line; antennæ whitish at base. *Expanse* 48 m. m.

I have received from Mr. J. Pettit, of Grimsby, Ont., two specimens of a small species of *Scopelosoma*, which I propose to call *Pettiti*. The little roughly scaled species presents some resemblance in ornamentation to *Scopelosoma Graefiana*. The color is orange ferruginous over light yellow;

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head, antennæ, thorax and fore wings of this color. Primaries with three transverse darker lines, the t. a., median shade and t. p. lines, all indistinct, the t. p. line followed by faint blackish points. Orbicular small, round, pale centered. Reniform large, vague, sometimes with a few blackish scales inferiorly. T. a. line perpendicular, undulate; t. p. line even. Abdomen and hind wings above, very pale silky yellowish; beneath a little darker, the latter with orange spot and median and terminal lines; fringes concolorous. Fore wings with line and dot faintly shown. *Expanse* 30 to 31 m. m.

ARGYNNIS MYRINA AND ITS ALLEGED ABNORMAL PECULIARITIES.

BY W. H. EDWARDS, COALBURGH, W. VA.

In the Am. Nat., Sept., 1872, Mr. Scudder published an essay entitled "The Curious History of a Butterfly," in which it is stated that in two N. American species of the "genus Brenthis," namely, *myrina* and *bellona*, occurs a phenomenon considered by the author to be quite unique among butterflies: there being two sets of individuals, each following its own cycle of changes, apparently with as little to do with the other set as if it were a different species; each set having its own distinct seasons and thus giving rise to the apparition of two or three successive broods in the course of the year. At the very end of the season one of these sets, which the author calls the "aestival," lays eggs which hatch in a few days; the larvæ at once commence hybernation, to awake and begin to feed early the next season, attaining their growth by the end of June, and emerging as butterflies about the middle of July. These butterflies continue on the wing till the end of September.

The second set, called the "vernal," hybernate as half grown caterpillars, and the butterflies from them appear about the middle of May, sometimes earlier, but are hardly common before the end of May, and also live till September. These lay their eggs the last of July and early in August, the eggs hatch, the larvæ moult twice, and beyond that, behave differently, some at once entering on their hybernation, giving butterflies

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in May again; the others proceeding to chrysalis, from which the butterflies emerge in September, "*doomed to an untimely end. Their sisters of the aestival series are busily laying eggs to perpetuate the race, but to them is this boon denied; the cold autumnal blasts sweep them away before the eggs are half developed in their ovaries.* It is, in fact, a vain effort of Nature to develop a second brood." Elsewhere this is spoken of as a "waste of energy on the part of Nature."

It is expressly stated that "*in this butterfly the eggs are wholly undeveloped at the birth of the female.*" The above statement of facts leads the author to conclude that "we have here two independent series in the same species, each single-brooded, but one making an effort towards a second generation, *invariably ending in disaster;* that it is improbable that the blood of both series ever commingles through the union of the butterflies of the two series, because, although the generations overlap, *the males of a brood are the first to disappear*, and the *females the last to appear*, and at best there would be few that could thus mate; moreover, *since the eggs of the freshly emerged females are not fully developed for weeks or even months*, the effect of such a union would be questionable. Yet if there is no union between the two series, then are the vernal and aestival groups practically as distinct from each other as any two species. The two groups *show a difference such as usually characterizes somewhat distant genera.*"

Mr. Scudder's observations on these species were so different from those on an allied European species, *euphrosyne*, as related by Doubleday, that he could not comprehend the statement given, and says: "By this account the butterflies *(euphrosyne) lay their eggs on their first appearance; either they differ in toto from their congeners in America, or there is some error in this statement* (of Doubleday).

When I first read Mr. Scudder's paper it occurred to me that possibly there was error in his statement of facts. But as these butterflies are not inhabitants of my district, I have had no opportunity to put Nature to the question till the last season, and the result is as I anticipated. She may dry her tears, unveil her blushing cheeks, and walk forth acquitted of the horrid charge. I think it will appear that the history of the butterfly, although curious, as I find the history of every species of butterfly which I have studied, is not unlike that of many of the double-brooded species, and certainly runs parallel with some of them.

In July, 1875, I was at Hunter, in the Catskill Mountains, and both

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myrina and *bellona* were rather abundant. The females of both species were more or less worn and were heavy with eggs. I shut up half a dozen of each species in a muslin bag, which was drawn over the top of a flower pot in which I had set plants of wild violet. Between the 20th and 25th inst. both species laid many eggs, and these hatched in about five days. I lost nearly all the *bellona* eggs by mailing them to Coalburgh, but three which I sent Miss Peart for drawings gave larvæ, and in due time the larvae became chrysalids and yielded butterflies on or before the 1st of September.

But as I kept the larvae of *myrina*, my observations relate to them only. These grew very rapidly, moulted five times, and the first of them reached chrysalis on the 27th of August, about thirty days from the egg. The butterfly emerged on the 3rd of September, and was a female. Next day five emerged, three ♀ and two ♂ (I mention the sex to show that the females emerge as early as the males, and this is so in all species of butterflies which I have made observations on, except one, *Apatura clyton*, and in this the male has been found to appear about a week in advance of the female). The other butterflies emerged at intervals till September 9th, by which time twenty-five had appeared. Not one of this brood of larvae hybernated after the third moult, or at all, and all the chrysalids gave butterflies. On opening the abdomens of the newly emerged females, *they were found full of nearly mature eggs.* These eggs were soft, but nearly or quite full sized, and distinctly ribbed, which would not be so if they were not almost ripe for deposition. I have never found this to be the case in the larger species of *Argynnis*, there being so far as I have examined, and I have done this in very many instances, no appearance of the egg for weeks after the females are on the wing. But in some other butterflies, as *Papilio ajax*, the eggs are almost ready to deposit when the female issues from the chrysalis, and it is certain that she deposits them within a few days—say a week—from chrysalis.

So far I have given my own observations upon *myrina*. Adding to them such as are related by Mr. Scudder, and not involving the error as to a long period of time being required to mature the eggs, and the history of the species resolves itself into this shape.

The butterfly of the fall brood emerges from chrysalis about the 1st of September, lays eggs on or before the 15th, the larvae hatch between the 20th and the 24th, and go at once into hybernation, to awake in May, and reach chrysalis about the middle of June, and the butterfly about the 25th

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of June. If, however, any of the last brood of larvae, instead of at once beginning hybernation, incline to feed for two or three weeks, there is plenty of time before severe frosts come to do so and reach the third moult, at which time, in all five-moulting species that I have experimented on, the hybernation occurs, if at all. In such case the larvae would also awake in May, and would reach the butterfly stage two or three weeks earlier than the 25th of June. If any of the summer brood of larvae hybernate after their third moult (a fact which I had no opportunity to establish), then the larvae of both broods would awake at the same time and become butterflies at the same time, making the summer brood. It is to be observed that the several stages of the same brood of larvae do not occur in exactly the same periods of time. From eggs laid on the same day, by the same female, some of the larvae hatched will reach chrysalis several days before others. In the larger *Argynnis* there will be such a difference, amounting to two or three weeks. Therefore some of the larvae which hybernate at the third moult may be retarded so that their butterflies shall emerge contemporaneously with those which proceed from the larvae that hybernate as soon as they leave the egg. The case is parallel with that of *Phyciodes nycteis* and with that of *Apatura celtis*, both double-brooded species, both discovering larvae from the summer brood which hybernate when half grown, while a part of the brood go on to chrysalis and give the fall brood of butterflies, these again producing larvae which also hybernate. (In both these the last hybernation begins after the larva is half grown, the third moult in *nycteis*, the second in *celtis*.) Mr. Scudder has made a hypothetical case which is precisely the actual case that I have set forth above. He says: "Should the season be so long that the *second brood could lay eggs*, the caterpillars would then be forced to hybernate as those of the aestival series and *become members of that series the next year. Thus the vernal series would continually feed the aestival*," &c. Moreover, in no species do the several preparatory stages of its members run even. On the contrary, in any, whether single or double brooded, there will be found by different females eggs freshly laid, eggs ready to hatch, young larvæ and mature larvæ, all at the same time. By this means there is kept up for a long period, often for weeks, a succession of newly emerged butterflies of the same brood, and the newer and older are constantly mating. On one day in September of this year I cut a branch of Wild Senna *(cassia)*, on which at the moment were newly laid eggs of *Terias nicippe*, larvæ in every stage of growth, and a butterfly of the same species just emerged and still resting on the empty shell of its chrysalis.

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I have bred from the egg four of our larger species of *Argynnis*, viz., *diana*, *cybele*, *aphrodite* and *idalia*, and have had the egg and chrysalis of *atlantis*, and have drawings of the several stages of each species; and now having bred *myrina*, I can say that so far as I have seen of the preparatory stages of all these species, they are congeneric The simple difference that is found among them is not in the shape of the eggs, or the forms and habits of the caterpillars, or the forms of the chrysalids, but merely in the behavior of *myrina* as regards the second brood, each of the others being, so far as is yet known, single brooded.* And neither in the preparatory stages nor in the butterflies themselves do I see any reason for separating *myrina* and the smaller species from the genus *Argynnis*, or making more of them than a group. A group is as expressive as a genus, and a genus with its groups should present at one view an entire class with all its families, inter-related, though in differing degrees, as having had a common ancestor, and any system of arrangement which elevates what are properly groups into independent genera, destroying the unity of the class, strikes me as unnatural, and therefore unphilosophical.

But in passing we may as well look into the facts about this genus *Brenthis*—*Brenthis* Hübner (Scud. Syn. List, 1875) and learn something about the manufacture of modern genera.

The species *myrina* is closely like *euphrosyne* of Europe, and congeneric with it, no matter how *Argynnis* be split up. Hübner, in his Verzeichniss, amused himself with assorting the known butterflies into batches or parcels, as a child would sort his alleys and taws, by color, stripes and shape, putting blues into one lot, browns into another, one-striped into a third, two-striped into a fourth, regardless of characters which would be generic, that is, *which would indicate blood relationship or a common descent.* It is a very rare thing to find one of his batches —which he called a coitus, meaning a batch or assemblage, and which is in no sense a genus, for the element of common descent does not enter into this whimsical system—co-extensive with a genus. It is by the merest chance if it is so. Nor does the coitus correspond with a natural

* Though there are some reasons for suspecting that in West Virginia the other species must be double brooded also. That, however, is not determined, and I do not assume it. But this difference in the same genus as regards the number of broods, supposing it exists in *Argynnis*, is paralleled by the *Apaturas celtis* and *clyton*, the former being here double, the latter single brooded.

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group under a genus. At first sight it may sometimes seem to do so, the species being assorted in twos and threes, but it will be found that whether the coitus embraces two or twenty species, the butterflies under it are most likely such as belong to distinct genera, and sometimes so distinct that one hundred or two hundred pages of Kirby's Catalogue separate them. And an instance of this mis-assortment is found in the coitus *Brenthis*. Under this head are ranged five species, viz., *hecate*, *dictynna*, *thore*, *daphne* and *claudia*, the latter as much out of place in such company as a horse in a drove of asses. But the horse is dapple and the asses are dapple, each has one tail and two ears, and behold a Hübnerian coitus! The definition of *Brenthis* is "the hind wings below gaily clouded, pale spotted," and it is ranged under the first family of the fifth stirps. This family is called Reticulatæ, and embraces two coitus only, viz., *Phyciodes*, under which our *tharos* comes, and *Brenthis*. The definition of the family is thus given: "The wings above striped like a grating; the hind wings below spotted with colored spots on a pale yellow ground, marked with eye-like spots." *Thore*, an European species very much like our *bellona*, and congeneric with it as *myrina* is with *euphrosyne*, is placed in *Brenthis*, along with *claudia*, and these are separated from the batch which includes *myrina*, *not merely by the limits of a coitus*, *but of a family even*, *in order to get them among the Reticulatæ by the side of tharos*. This next family, the Phalaratae, is thus defined: "The wings differently spotted, the under side ornamented with pearl-colored spots." And the first coitus under it is *Argynnis*, the definition of which is: "the hind wings below variegated, spotted with shining white." Under this coitus comes *euphrosyne*, and therefore *myrina*, included in this loose definition solely because it has white spots. Two more coitus are made, called *Issoria* and *Acidalia*, which include the larger species of *Argynnis* (not Hübner's), *lathonia*, *cybele*, *diana*, &c. Of these absurd divisions, Mr. Edward Doubleday (Remarks on the genus *Argynnis)* says: "they are so unnatural that they can in no case be adopted."

But suppose these batches were not unnatural, but were co-extensive with genera, how comes *myrina*, which, as it agrees with *euphrosyne*, is placed by Hübner under *Argynnis*, filling in some little degree the requirements of that coitus, to be remanded to the coitus *Brenthis*, which belongs to another family even, placed along side of *Phyciodes tharos*, and the requirements of which coitus it does not fill at all? It is an unwarranted use of Hübner's name, applying it to what he expressly says it shall not be applied. It is taking one of his blue taws and dropping it among the

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striped ones, doing violence to all his notions of symmetrical arrangement. He would have rejected the blue taw with abhorrence. What does the word "*Brenthis* Hübner" mean, if not that the genus *Brenthis* was created by Hübner, and that his definition includes the species sought to be placed under it ? If it has any other meaning I am ignorant of it, and if it does mean that it is false. This is a fair sample of the uses to which Hübner's absurd and worthless Catalogue has been put. Very few Lepidopterists in this country know anything of Hübner's books, and most are disposed to accept in some degree the dicta of any one who sets up to reform the nomenclature. But if reform be needed, which is very questionable indeed, it is not to be brought about by lugging Hübner into the arena. To go back at this time of day to the Verzeichness is to go back to the balls and tops and games of school-boys.

NOTE ON DATANA PERSPICUA G. & R.

BY A. R. GROTE, BUFFALO, N. Y.

Since the original illustration and description of this species, ten years ago, in the Proceedings of the Entomological Society of Philadelphia, it has not been noticed, except by the late Mr. B. D. Walsh, in the same Proceedings, vol. 5, p. 194–5. I have been since last year indebted to Prof. C. V. Riley for a number of specimens of *perspicua*, raised from larvæ found on Sumach. It is enough to say that the specimens bear out the specific validity of a form which is perhaps the most easily recognized among the difficult species of this genus. I was able to separate the imagos of a number of the species bred by Prof. Riley, by the characters laid down by the late Mr. Robinson and myself in our revision of the genus. Specimens of *contracta*, *integerrima*, *ministra* and *perspicua* were sent me by Prof. Riley; no true specimens of *angusii* were included. I observed the larva of *integerrima* at Detroit, August 13, and again on Grand Island, Niagara River, Aug. 19, apparently nearly full grown. I have not had hitherto any specimens of *perspicua*, before receiving those sent me by Prof. Riley, who will, I hope, give us some observations on the genus before long. I am glad also to be able to find that the facts

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relieve us from the imputation of having described "not the *species*, but the *individual*," placed upon us by the late Mr. Walsh in the case of *D. perspicua*. And as to the "very limited number of specimens," the argument which covers two pages seems to have been compiled almost wholly from Fitch and other writers who mixed up a variety of forms under the name of *ministra*, and who, in consequence, cannot be considered as any authority on the subject. I have yet to see imagos of *Datana* which I cannot refer to one or the other of the forms in this genus, which are separable also on larval characters. It matters little whether we call these forms "species" or "varieties," so far as the advisability of according them different Latin designations is concerned.

NOTES ON CERTAIN SPECIES OF ARCTIA.

BY A. R. GROTE, BUFFALO, N. Y.

Arctia arge (Drury).

A male specimen taken by the late Mr. C. T. Robinson, at Brewster's, N. Y., varies by the fore wings being black, the veins broadly bordered by flesh color. The ordinary triangulate black interspaceal markings have all fused. Hind wings shaded entirely with blackish, none of the usual spots being visible. Beneath as above. Body as in the type.

Arctia Anna Grote.

Contrary to Mr. Stretch's remark, two specimens of this species occurred in Penn. One is in Dr. Packard's collection, and is recorded by him in his Synopsis. The markings of the fore wings prevent the idea that it is a "melonotic" var. of *Persephone*, as suggested by H. Strecker. *Persephone* Grote was described *after* this species; I supposed at first the two belonged as ♂ and ♀, only one sex of each being known to me. More material is needed to decide these points, bare opinions being useless and offensive.

Arctia Michabo, n. s.

♀. Belongs to the series of *virgo, Saundersii (intermedia), Edwardsii, Blakei.* The size is next to *Saundersii.* It is like *virgo* in having black spots on the middle of hind wings, one rounded one on the median vein

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within and below the rounded discal spot; below this, on internal vein, is another sub-obsolete spot. The sub-marginal spots are very large irregularly triangulate; the marginal spots are limited to two superiorly, which do not tend to run along the edge of the wing as in allied forms; the fringes are but little paler than the rosy wings, which are more diaphanous than in its allies. Fore wings like *Saundersii* in having linear venular markings; the bands are like that species, the color is more pinkish, the discal stripe much broader. Beneath both wings alike roseate, with the black markings repeated. Thorax and head like its allies; the breast is however, pink, and the legs spotted with pink and not wholly blackish. Costa of fore wings without black markings beneath. *Expanse* 43 m. m. Nebraska, Mr. Dodge.

Arctia intermedia Stretch.

My specimens from Belfrage lead me to suppose a different species from that illustrated by Mr. Stretch, whose figure seems to me undoubtedly to represent *Saundersii*. It is probable that a number of specimens sent by Belfrage belong to a different species from that sent to Mr. Stretch, and I provisionally propose the name *Stretchii* for the following form. It differs from *intermedia* and *Saundersii* by the presence on the fore wings of an inner sub-basal transverse band, narrowing at median vein, broad below the longitudinal stripe. On hind wings *all* the spots much reduced. The anus is not black at the sides. Oct. 7, 10. Dr. Harvey has recently referred specimens of this form to *Saundersii*.

Arctia Snowi, n. s.

♀. Habit of *nais*, of which I thought it at first an extreme variety, but the fringes on both wings are wholly black. Head, thorax, legs, wholly black; abdomen crimson at sides. Wings wholly black. A crimson discal rounded lunule, narrowly yellow edged; a short broken transverse bar, similarly colored, opposite the disc. Hind wings with a moderate crimson lunulated spot outwardly towards the apices. Beneath as above, a dash above the discal spot. *Expanse* 38 m.m. Kansas, Prof. Snow.

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DESCRIPTION OF A NEW HADENA FROM THE WHITE MOUNTAINS.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Hadena ancocisconensis (nov. sp.)

Expanse 40 m. m. Length of body 16 m. m.

Eyes naked, with short lashes. Antennæ in the female simple. Palpi gray, the third joint very short. Collar whitish beneath, above bearing a transverse, partially interrupted black line. Thorax mingled light and dark gray; no prothoracic tuft, metathoracic tuft low and longitudinally furrowed; sides of the thorax deep black and very conspicuous. Abdomen light gray, with several slight dorsal black tufts, and one very strong one, tipped with white on the third segment. Tibiæ unarmed. Anterior wings having the basal space light gray, whitish at the base, and contrasting with the thorax and a black acute basal dash; inner margin of the wings white near the base, this white space is bounded above by another basal dash, finer than the one last mentioned; median space darker gray; the ordinary spots are of the usual shape, faintly outlined in black and filled with light gray, which extends around and beyond them, but less distinctly; interior line simple, black and very acutely dentate, forming inferiorly two very long teeth, the upper of which is connected by a black dash with the exterior line; the latter is well removed towards the outer margin, obsolete above, below it appears as an oblique black line, followed by a distinct white shade, this is followed by another thicker black line, slight traces of the subterminal line otherwise obsolete, and another white dash before the angle, enclosing a black spot; a series of black dashes in the terminal space, three of which are united, forming the usual W-shaped marking; the white subterminal shade line extends sometimes around this marking. Fringes gray, with white points at the terminations of the nervules. Posterior wings gray, darker towards the margin. Beneath gray, nearly unicolorous, without the usual median line.

Hab. Glen Valley, Mt. Washington, N. H.

Described from a specimen in my collection, taken at sugar in August.

The alternation of black and white at the inner angle makes this species very easy to recognize; it differs in this respect from all other members of the genus.

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THE LUNA MOTH *(Actias luna).*

BY R. V. ROGERS, KINGSTON, ONT.

As supplementary to my remarks on this pretty creature in the August number of the CAN. ENT., I would say that on June 6th a friend gave me a captured female Luna. For two or three nights I used her as a trap to entangle unwary males, but in vain as far as my cabinet was concerned; the weather was cold. On the 7th, 8th and 9th, during the silent watches of the night, she deposited in her place of confinement, in all, about 100 eggs of a dark brown or chocolate color, flattened at the sides, smooth and about .005 of an inch in length; the sides were of a lighter shade. On the 13th the moth died, having accomplished the end of her existence. On the 20th the first little larvæ appeared, having made their escape by eating an oval opening in the end of the shell; the inner surface of the egg now appeared perfectly white. The caterpillars were about .02 of an inch in length; head black, greenish on top and yellowish in front; the body black, with two yellow spots on each segment, and having numerous yellow hairs; the under part of the body and feet and legs were of a light yellow. Some crawled about with the empty shell on their tails, others carried it as an umbrella over their heads, but the majority seemed to discard it at once. The first day they were in a dark box, and they seemed very restless and would eat nothing; the next day I put them in a box with a glass cover, and they at once settled down contentedly to their life-long work of eating their daily bread. Others were born on the 20th and 21st. I fed them on elm leaves. On the 27th they had grown to over a third of an inch in length, and now the warts upon each segment were apparent, and the little hairs upon them were also visible.

On the 30th they began to change their skins; the head and body were now of a light green, with yellow warts on each segment; the hairs were neither as numerous or as distinct as before; there were a few dark ones on the front segments.

On the 4th of July the length of the largest was .45 in.; on the 11th, .6 in.; on the 13th they moulted a second time, and on the 18th they had attained the length of almost an inch.

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Unfortunately, the food, the weather, the close watching, the narrow confinement, or something or other, did not agree with these unfortunate caterpillars, and one by one they would suddenly die, and my attempt to reap a rich harvest of cocoons was utterly foiled, and I succeeded in getting—not one; although up to the very day of their death they would eat the elm leaves apparently with great gusto; it was difficult for me to get a change of diet for them.

ON A NEW EUCHAETES.

BY A. R. GROTE, BUFFALO, N. Y.

Euchaetes Spraguei, n. s.

♂. Allied to *elegans*, but entirely stone color, like *egle*.

Fore coxae, head at base, two thoracic vittae, costal and internal margin of fore wings crimson. Abdomen above bright red, with dorsal black dots.

Kansas (Prof. F. H. Snow).

I name this beautiful species, which is of the same size as *elegans* and *Oregonensis*, after my friend Mr. Henry S. Sprague, of Buffalo, N. Y.

BOOK NOTICES.

Injurious Insects of Michigan, by A. J. Cook, of the Michigan State Agricultural College, 8vo., 48 pages, with numerous cuts. We are indebted to our esteemed friend Cook for a copy of this excellent report, in which is contained a concise summary of most of the facts known relating to the life history of a large number of our most injurious insects, with the best means of subjugating them. It is intended as a practical hand book to guide the agriculturists of Michigan, a purpose it is well qualified to serve.

We have also received from the same author a copy of an address delivered by him on *Phylloxera vastatrix*, at Munroe, Mich.; 8vo., pp. 10, with illustrations.

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The Canadian Entomologist.

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THREE NEW GALLS OF CECIDOMYIÆ.

BY C. R. OSTEN SACKEN, CAMBRIDGE, MASS.

I hardly need an apology for presenting from time to time to the entomological public descriptions of galls of *Cecidomyiæ*, even when I did not succeed in rearing the fly. Such observations, unless published soon, are very apt to be lost; once published, they gradually accumulate and furnish a welcome material for the future monographer. To facilitate reference, I give here a list of my previous publications on the galls of North American *Cecidomyiæ*:—

1. On the N. Am. *Cecidomyiæ* (In the Monogr. N. A. Diptera, vol. I, p. 173—205).

2. *Lasioptera*, reared from a gall on the Golden-rod (Proc. Ent. Soc. Phil. 1863, p. 368—370).

3. Two new N. A. *Cecidomyiæ* (Proc. Ent. Soc. Phil. 1866, p. 219—220).

4. Biological notes on Diptera. Article first: *Asphondylia monacha*, n. sp., and other galls on Solidago (Trans. Ent. Soc. Phil. 1869, p. 299—303). Article second: A new Amer. *Asphondylia*; On some undescribed galls of *Cecidomyiæ*. Article third: A *Cecidomyia* living in pine resin (Diplosis resinicola, n. sp.); a gall of *Cecidomyia* on Wild Cherry; additions, corrections.

Cecidomyia (tiliæ) *verrucicola*, n. sp. Wart-shaped, round, pale green galls, 3—4 millim. in diameter, projecting on the upper and underside of the leaves of the linden. They occur between the ribs and veins and often upon them. In autumn they become brown, hard and woody, and spring open on the underside, a circular piece detaching itself and either falling to the ground, or remaining fastened to the gall by a small portion of its circumference, in the shape of a lid. Inside of the gall, when green, there is a low-roofed cavity, containing a white larva, with a distinct

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breast bone, heart-shaped anteriorly, and ending in an elongate point posteriorly. The dry galls are empty. I found them common on Goat Island (Niagara Falls), on the hills near West Point, N. Y., in Cambridge, Mass., etc., in August and September, on the young shrubs of the linden.

Cecidomyia (urticæ) *urnicola*, n. sp. Galls on the upper side of the leaves of *Urtica gracilis*, either on the midrib, or, more often, on the lateral veins. Urn-shaped (I mean the shape produced by cutting off the smaller end of a slender pear) up to 3 m. m. high, subsessile (that is, connected by a very small surface with the leaf), pale green, semi-transparent, succulent gall, bearing a short style or nipple at the upper, truncate end. Inside, the larva of a *Cecidomyia*. Lake George, July, 1863; Trenton Falls, July, 1874; not uncommon, but not in large numbers. Each leaf bears one, sometimes two galls, seldom more.

The gall produced by a *Cecidomyia* on the European nettle, and described by Perris, Ann. Soc. Ent. France, vol. IX, p. 401, is different from the present gall.

Asphondylia (asteris) *recondita*, n. sp. Deformed terminal buds on the principal and the lateral branches of *Aster patens*. These galls consist merely in an arrest of growth and consequent accumulation of leaves, forming a bud-like body up to 10 or 15 m. m. in length. Inside I found pupæ which their structure proves to be those of *Asphondylia*. The horn-like, sharp projections on the head are contiguous here, precisely as in *Asphondylia sarothamni*, figured by Winnertz (Linn. Entomol. vol. VIII, Tab. I, f. 6). I found these galls on Lloyds Neck, Long Island, in September, but did not succeed in rearing the fly.

ON NORTH AMERICAN SPECIES OF PLUSIA.

BY A. R. GROTE, A. M., BUFFALO, N. Y.

Plusia monodon, n. s.

Allied to *precationis* and *gamma*. It differs by the distinct yellow shaded geminate t. p. line having but a single acute tooth at vein 2; the line running more outwardly at this point, and being otherwise even throughout. Also by the shape of the metallic spot; this is open, silver

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bordered, running outwardly obliquely from the median vein to the t. p. line at vein 2, sub-triangulate, the bordering lines fusing outwardly to a point, forming an oblique uneven V. The median space below and beyond the metallic mark is shaded longitudinally with obscure chalceous. The reniform is a narrow angulate dark lunule. The orbicular incomplete, whitish edged. The subterminal is more dentate than usual, and shaded anteriorly with dark brownish, with a golden reflection inferiorly. The median space is dark brown above the metallic mark and below the median vein and the base of vein 3; also inferiorly. The ground color is a purple gray shaded with brown. The t. a line is even, rounded, distinct, like the t. p. line in color. Hind wings rather pale, with blackish hind borders; beneath pale grayish, not yellowish, and without the lines of *precationis*.

Expanse 36 m. m. Cape Breton. From Mr. Roland Thaxter.

Plusia pseudogamma, n. s.

Like *gamma*, but with a more contrasted color of fore wings. The t. p. line more rounded opposite the cell, succeeded by a white shading which appears again over internal angle without the s. t. line. The metal mark is like *gamma*, but broader and pure silvery. The space about the spot is shaded with deep brown. Inferiorly the median space is entirely chalceous. The t. p. line is stained with reddish and the inward tooth opposite the extremity of the metallic mark is deeper than in its ally. The s. t. line is less dentate than usual, preceded by a chalceous and brown shading. Hind wings pale gray with blackish borders. Abdomen with dorsal tufts. Beneath obscure gray, unlined. This species has a strangled reniform with narrow pale annulus, like *gamma*, while the orbicular is less conspicuous and the t. p. line is more even superiorly than in its ally.

Expanse 42 m. m. Cape Breton. From Mr. Roland Thaxter.

Plusia Dyaus, n. s.

Between *verruca* and *precationis*. Ground color pale olive-lilac gray. Collar and face of dorsal tuft olivaceous. Metallic spot an obtuse silver open mark, succeeded by a well sized detached silver spot. Orbicular with a pale shaded annulus, inconspicuous. Reniform incomplete, with a deep outer constriction and here outlined in pale gold, the annulus being perceivable inferiorly; beyond the reniform the cell is chalceous and inferiorly the median space is golden shaded, the wing about the metallic

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marks being olive brown. Terminally the wing is washed with pale golden and there are two deeper golden shades resting on the whitish terminal line below the apex, the lower triangulate. The s. t. line is also superiorly preceded by darker shades. The ordinary lines are pale golden. Fringes pale, dotted at base, with a more prominent black dot opposite vein 3 and the triangulate deeper gold mark. Hind wings largely blackish fuscous, with pale fringes. Beneath with double lines. Nearest to *precationis*, a little smaller, paler, not purple colored, the median space all golden inferiorly.

Expanse 34 m. m. Texas, Belfrage, Nov. 2, No. 142.

Also from Jamaica, Mr. Thaxter, No. 2,076.

It may be distinguished from *verruca*, also, by the subterminal line not forming a broad tooth apically below costa, but being here rounded to the sinus opposite the cell.

Plusia pedalis, n. s.

Allied to *gamma* and *ou*. Hind wings wholly blackish fuscous, with whitish fringes lined at base. Fore wings more uniformly dark colored with the ornamentation of *ou*, but with the yellowish open metallic mark short, broad and somewhat foot-shaped, without any accompanying dot. Beneath dark, with median common line.

Expanse 36 m. m. Kansas, Prof. Snow, No. 273.

The following is a list of our North American species, following the method of Dr. LeConte's Catalogue of N. A. Coleoptera, adopted in Part 1 of the List of North American Lepidoptera by the late Mr. Coleman T. Robinson and myself, published in Philadelphia, Sept., 1868.

Plusia *Hubn.* (1806).

Type, Plusia chrysitis of Europe.

1—purpurigera *Grote.*
Dera purp. Walk.
2—aerea *Guen.*
Agrapha aerea Hübn.
3—aereoides *Grote.*
4—balluca *Guen.*
Dyachrisia ball. Geyer.
5—metallica *Grote.*
Pl. bractea ‡ Grote.
6—contexta *Grote.*
7—Putnami *Grote.**
8—striatella *Grote.*
9—formosa *Morr.* **
Leptina form. Grote.
10—thyatiroides *Guen.*
11—mappa *G. & R.*
12—bimaculata *Steph.*
Pl. u-brevis Guen.

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13—biloba *Steph.*
14—verruca *(Fabr.)*
15—Dyaus *Grote.*
16—precationis *Guen.*
17—laticlavia *Morr.*—
18—labrosa *Grote.*
19—monodon *Grote.*
20—pseudogamma *Grote.*
21—gamma *(Linn.)*
22—ou *Guen.*
23—fratella *Grote.* * * *
24—u-aureum *Boisd.*—
25—pedalis *Grote.*
26—brassicæ *Riley.* * * * *
Pl. ni ‡ Grote.
27—oxygramma *Guen.*
Autographa oxygr. Geyer.
28—mortuorum *Guen.*
29—8-scripta *Sanborn.*
30—viridisignata *Grote.*
viridisigma Grote.
31—epigaea *Grote.*
32—ampla *Walk.*
33—simplex *Guen.*
34—pasiphaeia *Grote.*
35—diasema *Dalm.*—
36—parilis *(Hubn.)*
37—alticola *Walk.*
38—Hochenwarthi *(Hoch.)*
Noctua divergens Fabr.
39—devergens *(Hubn.)*—

The following species cannot as yet be identified from published data concerning them: Plusia flagellum, indigna, selecta, secedens of the British Museum Lists; Plusia falcigera and rectangula of Kirby; Noctua omicron of Linné.

ON SCOPELOSOMA AND ALLIED GENERA.

BY A. R. GROTE, BUFFALO, N. Y.

Eucirroedia, n. g.

The shape of the fore wings is like *Scoliopteryx*, and the ornamentation is like that genus, while the stigmata are well defined, the course of the lines being similar in the two genera. This is a much more robust form

* This species seems to vary in color; one specimen is very like *festucae* in this respect. A character is offered by the t. p. line, which runs inwardly to a point below the discal dot in *festucae*, and allows of an extension of the silvering within this tooth. In *Putnami* this sinus is rounded and shallower.

** Unknown to me since 1866, when I described the species and at once returned the type to my friend Mr. Treat; I indicated at the time the structural difference in the length of the palpi. Both this species and *thyatiroides* are apparently mimetic of the Bombyciæ.

*** Contrary to Mr. Morrison's supposition, I regard this as a valid species, differing specifically from the larger *P. ou*, taken by myself in Alabama. The t. p. line is straighter, the dot of the metal mark is separate, the size is uniformly smaller.

**** Dr. Speyer regards this species as valid on new characters; a Californian specimen does not differ from my Eastern material.

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than the European *Atethmia xerampelina*, and has different shaped, more dentate primaries. Eyes naked, tibiae unarmed. *Eucirroedia pampina* (Guen.) has the colors of *Fodia*. I would restrict *Xanthia* in North America to the species *X. togata* (silago), also found in Europe; the genera might follow in this manner: *Glaea*, *Xanthia*, *Fodia*, *Eucirroedia*, *Scoliopteryx*, *Scopelosoma*, *Lithophane*. I, at one time, identified *X. aurantiago* Guen., but have now no specimens before me.

Scopelosoma.

The North American species are now eight in number, *sidus* Guen. being unknown to me, unless the latter is = *vinulenta*. The difficulty has arisen in that *Walkeri* varies in color, so that certain specimens seem to accord with M. Guenee's comparative description of *sidus* as well as *vinulenta* does. However, I am persuaded that it is more probable that *sidus* is founded on an individual of *vinulenta*, as I at first believed, and I only wait some more positive data to restore the name. It is necessary for the purpose to compare M. Guenee's type. The N. Am. species are then as follows:

Pettiti Grote, *Graefiana* Grote, *ceromatica* Grote, *vinulenta* Grote (= *sidus?*), *Walkeri* Grote, *Morrisoni* Grote, *devia* Grote. No species are yet known from California.

Litholomia, n. g.

In the shape of the primaries there is a marked resemblance to *Lithophane* and *Scopelosoma*, the costal margin being straight. The inner margin is straight and nearly as long as the costal, the exterior margin being slightly and evenly rounded; the wing is nearly of an even width throughout. The tibiæ are unarmed. The eyes are naked, lengthily lashed. The head is sunken, or oppressed. The male antennae simple, ciliate beneath. The thorax is somewhat rounded and full, approaching *Lithomia*, not quadrate as in *Lithophane* and *Calocampa*. The abdomen is untufted, somewhat flattened, with a dorsal carina, not as rounded as in *Lithomia*. The palpi are short, not exceeding the front. Ornamentation like *Lithophane* and allied genera.

Litholomia napaea.

Antennae white at the base. Cinereous; markings distinct. Lines double, black, distinct, perpendicular. T. a. line thrice waved, component lines divaricate, equally distinct. Orbicular shaded with white,

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ill defined, below it a very narrow line descends towards internal margin beyond; the distinct, slightly waved, broad, median shade line crosses the wing; this line is accompanied by a diffuse shading which in one specimen is tinged with ferruginous. Reniform filled with blackish, forming a larger rounded inferior spot. T. p. line nearly perpendicular, very slightly exserted opposite the cell, the inner line extending outwardly dentatedly on the veins. Subterminal line irregular, whitish, preceded by a blackish shading, denticulate. An even black terminal line, obsoletely interrupted; fringes even, gray, dotted with blackish. Secondaries blackish fuscous with paler fringes. Beneath paler fuscous, with blackish discal spot and median, irregular. denticulate line; on fore wings the median line is distinctly and broadly inaugurated in deep black, near the discal mark, but afterwards becomes obsolete; terminal space paler than the rest of the wing. Collar with a black line above; behind, on the dorsum are two more faint lines across the base of the tegulae.

Expanse 27 m. m. *Hab.* St. Catherines, Mr. Geo. Norman, No. 226, 1115; Quebec, M. Bélanger.

Identified by Mr. Morrison, from a photograph, as his *Scopelosoma napaea.*

AGROTIS RUBIFERA, N. S.

BY A. R. GROTE, BUFFALO, N. Y.

Allied to *rubi* and *conflua.* Taken by Mr. Norman in Canada, and considered to be identical with the European *rubi* in former writings. Abdomen and hind wings paler than in *conflua.* Fore wings of a darker purply-reddish brown; t. a. line geminate, a black spot before the orbicular and usually the disc between the spots is black stained. Claviform indicated. Subterminal pale, more waved, but like *conflua,* differing from *rubi;* beneath the common line is not diffuse as in *conflua.* Thorax darker than fore wings, with front and palpal tips pale. *Expanse* 28 m.m.

Dr. Speyer, to whom I sent a specimen, regards the species as different from *rubi,* but finds no characters to separate the European *Xanthia togata* from a N. A. specimen determined as this latter species, sent to him at the same time.

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LEPIDOPTERA COLLECTED AT GODBOUT RIVER, NORTH SHORE OF THE ST. LAWRENCE, DURING THE SEASONS OF 1874–75.

BY NAPOLEON CORNEAU, RESIDENT.

Papilio brevicauda *Saunders*.....9th June, rare.
" turnus *Linn*.....20th June, rare.
Pieris rapæ *Linn*.....26th June, rare.
" borealis *Scudder*.....22nd June, uncommon.
Colias interior *Scudder*.....15th July, rare.
" philodice *Godt*.....14th July, rare.
Vanessa antiopa *Linn*.....2nd June, common.
" J-album *Bois*.....22nd Sept., rare.
" Milberti *Godt*.....29th May, rare.
Pyrameis atalanta *Linn*.....5th July, common.
" huntera *Smith*.....15th July, rare.
" cardui *Linn*.....24th June, rare.
Argynnis atlantis.....15th July, common.
" myrina.....7th July, rare.
" bellona.....8th June, rare.
Melitaea tharos var. Batesii.....16th July, common.
Limenitis arthemis *Godt*.....15th July, common.
Grapta progne.....29th May, rare.
Lycaena lucia *Kirb*.....11th June, common.
Glaucopsyche Couperi *Grote*.....23rd June, common.
Hesperia mandan *Edw*.....July, rare.

Good specimens of the above can be obtained from William Couper, 67 Bonaventure Street, Montreal.

NOTES ON THE LARVA OF CATOCALA ILIA, CRAM.

BY F. B. CAULFIELD, MONTREAL, P. Q.

On June 15th, 1874, Mr. Wm. Couper, while collecting on Montreal Mountain, found a larva on Oak, which he kindly gave to me. It appeared fully grown, and was a little over two inches in length.

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Body onisciform ; general color, gray. Head heart-shaped, strongly bilobed, pale green, with white blotches, twelve short black hairs in front, and near the top of the head there are four small tubercles of a white color, each of which is tipped with a black hair ; head surrounded with a broken border of dark streaks. Upper surface greenish gray, with an interrupted dorsal band of delicate blue gray spots, the whole minutely spotted with black. On the second segment are twelve small white hairs, four on fourth, fifth and sixth, six on seventh, four on eighth to twelfth, six on thirteenth. Sides delicate blue gray, marbled with spots of green and black, with a broken lateral band of a green color ; spiracles yellowish white, with a black ring ; behind each is a large wart tipped with a black hair. A fringe of short white fleshy filaments close to under surface. Under surface pink, with a row of transverse black spots, larger and darker on the middle segments. Feet and prolegs grayish white, spotted with green and black.

This larva was very sluggish during the day, but would fling itself about in a frantic manner if touched ; at night it was very restless, creeping about the box continually. It fed freely on Oak.

Spun up in a leaf June 18th, 1874. Imago emerged latter end of July, 1874, and proved to be *Catocala ilia* Cram.

TINEINA FROM CANADA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

(Continued from p. 147.)

GELECHIA.

G. albomaculella. N. sp.

A single specimen with the palpi broken off. Head pale yellowish tinged with fuscous. Thorax brown, with the apex whitish. Fore wings gray brown, under the lens appearing yellowish white and brown in irregular blotches, with a distinct white spot on the fold at about the basal fourth, the usual opposite white costal and dorsal spots at the beginning of the ciliae, a small white spot at the apex, and two others at the base of the dorsal ciliae. Ciliae sordid white, with a narrow brown hinder marginal line about their middle. Legs and abdomen beneath irregularly blotched with yellowish gray and dark brown. *Al. ex.* 1⅛ inch.

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G. niveopulvella. N. sp.

Palpi simple; third joint slender and longer than the second, dark brown; the second hoary at the tip; the third whitish on the upper surface at the base. Head brown, dusted with white, with a row of white scales across the forehead between the eyes. Antennae brown. Thorax brown, densely dusted with white, especially about the middle, where the white prevails. To the eye the fore wings appear very dark brown, with a white spot on the disc before the middle and two or three small ones behind the middle, and an irregular white fascia posteriorly angulated at the beginning of the ciliae; under the lens the wing appears to be pretty densely dusted with white and the spots are only aggregations of the dusting. Under surface and legs irregularly marked with dark brown and gray, and the tarsi are annulate with white. *Al. ex.* $\frac{11}{16}$ inch.

G. bicristatella. N. sp.

Palpi simple, second joint as long as third, and white on the inner surface and tip; outer surface dark brown; third joint ochreous, with a dark brown annulus about the middle. Antennae ochreous, annulate with brown. Fore wings pale ochreous, dusted and suffused with brown. There is an oblong tuft of dark brown raised scales on the fold, and a short brown streak between it and the dorsal margin. Another tuft of brown scales at the end of the cell, and the apical part of the wing is dark brown. Ciliae stramineous, with a narrow brown hinder marginal line about the middle of those of the dorsal margin. *Al. ex.* $\frac{9}{16}$ inch.

G. Belangerella. N. sp.

Second joint of the palpi a little swollen towards the apex, and the third as long as the second; second joint pale gray, third pale ochreous with a brown annulus before the middle and another before the tip. Head gray. Antennae brown. Thorax and fore wings gray, with a dark brown streak along the fold and two or three small spots about the middle of the wing and two more at the end of the cell slightly raised above the surface. There is a row of eight blackish spots around the apex. Hind wings somewhat sinuate beneath the tip, pale grayish fuscous. Legs dark brown; tarsi annulate with white. *Al. ex.* $\frac{9}{16}$ inch.

LEUCOPHRYNE., *gen. nov.*

Second joint of the labial palpi three times as long as the short conical third joint; the second joint projects nearly straight in front of the

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head, and is clothed with loose, somewhat spreading scales at its apex, but can scarcely be called tufted; the third joint is slightly recurved. No maxillary palpi; tongue scaled and of moderate length. Face full, wider than long, somewhat retreating. Eyes globose, moderate. Vertex short. Antennae simple (as in *Gelechia*).

Fore wings lanceolate. Cell rather narrow, closed. Four marginal veins proceed to the costal margin, the first from about the middle of the cell and much longer than the others, which proceed from the apical part of the cell, the fourth being furcate on the costa before the apex; the median sends four branches to the dorsal margin, the last of which attains the margin near the apex, opposite to the last subcostal marginal vein; submedian furcate at the base; the costal attains the margin before the middle. There is nothing in the fore wings to separate it from *Gelechia*.

Hind wings lanceolate, narrower than the fore wings, resembling in form and neuration the wings of *Holcocera*, and yet more those of *Plutella cruciferarum*. The costal vein attains the margin before the middle; the subcostal proceeds straight to the margin before the apex; the discal vein does not touch the subcostal, but terminates at its superior branch, which behind the end of the cell is connected with the subcostal by a very short transverse veinlet, immediately behind which it becomes furcate, delivering both branches to the dorsal margin before the middle; anteriorly it runs through the cell, parallel and close to the subcostal, but becomes obsolete before it reaches the middle of the cell. The median is three-branched and rounds gradually into the discal, which rounds up anteriorly to its superior branch. Submedian distinct.

L. tricristatella. N. sp.

Palpi reddish brown, sparsely dusted with white, which forms three very narrow and indistinct annulations on the third joint. Face pale yellowish, iridescent. Head and thorax reddish brown. Patagia and basal portion of the dorsal margin of fore wings ochreous yellow, with a small reddish brown tuft within the dorsal margin of the wing, not far from the base; remainder of the wing dark reddish brown, with a large erect tuft on the fold about midway the length of the wing, and a transverse tuft covering the discal vein. Ciliae of mixed brown and whitish scales, and paler than the wing. Legs brown, the tarsi annulate with whitish. The posterior tibiae with a whitish spot about the middle of the outer surface and the tip white. *Al. ex.* ¾ inch.

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TINEA.

T. marmorella. N. sp.

Head and palpi yellowish white: the second joint of the palpi brown on the outer surface. Thorax and fore wings white, marbled with dark brown spots, which are confluent, the basal fifth being white, except a brown spot on the base of the costa, one on the base of the dorsal margin, one on the fold and one between it and the dorsal margin; in the remainder of the wing the brown prevails; one of these dark brown spots is on the costa before the middle and reaches the fold, and another about the middle of the costa does not quite reach the fold, and behind it along the costa and around the apex is a row of distinct and separate dark brown spots, five of which are on the costal margin. There is a dark brown hinder marginal line extending through the middle of the dorsal ciliae, and the ciliae behind it are dusted with black. *Al. ex.* 3/8 inch.

T. minutipulvella. N. sp.

Outer surface of the second joint of the palpi dark brown. Palpi otherwise and the head white, with a sordid brownish spot between the antennae. Antennae yellowish white, annulate with brown. Thorax and fore wings white, minutely but distinctly dusted with pale brown, the dusting along the costa aggregated into minute brown spots, and also along the base of the dorsal ciliae, which are white flecked with pale brown. Hind wings grayish fuscous. Dorsal surface of the abdomen grayish brown, with a distinct dark brown line along each side. Under surface whitish; tip pale sulphur yellow. Legs brown on their anterior surfaces, whitish behind and the tarsi annulate with white. *Al. ex.* 5/8 inch.

T. marginimaculella. N. sp.

Outer surface of the palpi brown; inner surface and face white; vertex pale sulphur yellow, or, perhaps, rather deep stramineous. Maxillary palpi grayish white. Antennae silvery gray. Thorax and base of the costal portion of the wing brown, that color also being extended as a streak or series of spots along the fold to the dorsal margin and at the base of the dorsal ciliae. There are four brown spots on the costal margin, the last of which is placed at the beginning of the ciliae, and a row of brown spots extends at the base of the ciliae entirely around the apex; there is a dark brown spot on the middle of the disc and another at the end of the cell. Ciliae and hind wings silvery pale gray. Abdo-

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men brown, the apex silvery. The first pair of legs is brown on the anterior surface, and the tarsi are annulate with white. Middle and hind legs silvery gray. *Al. ex.* ½ inch.

In former pages of this journal I have described a few other species from Canada among species from the United States. In all of these instances the *habitat* is given, except in the single instance of *Œcophora boreasella*, where I find that I have omitted it. The single specimen from which it was described was unfortunately destroyed while under examination. It was received from Mr. Saunders, Editor of this journal, and was labelled No. 399. I do not know whether Mr. Saunders has other specimens or not.

(The specimen sent Mr. Chambers was the only one in my possession.—W. S.)

NOTES ON AN INTERESTING EASTERN VARIETY OF ONCOCNEMIS CHANDLERI.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Mr. Fred. Tepper has just sent me for examination a very interesting pair of insects taken on the sea shore of Long Island, which approach so nearly the type of *O. chandleri* in my collection from the mountains of Colorado, that I cannot separate them specifically, although there are certain differences, which I give below. The capture is the more valuable since the species of *Oncocnemis*, so far as known, inhabit only the mountains of Europe, Siberia, Colorado and California.

I propose the name *riparia* for this form, and in case the study of larger series of specimens should show it to be a good species, that name can be retained for it.

The principal difference between the insects is in the color of the posterior wings; in *chandleri* ♂ they are white with a broad black even border; in *riparia* ♂ they are entirely white, except that the veinlets are stained with black and there is a slight gray shading at the costal angle; this difference is seen still more distinctly beneath, and then on the anterior wings as well. The posterior wings of *riparia* ♀ above have a dark gray-black border, but beneath they are white as in the male.

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In the Coloradan species the outer surface of all the tarsi is checked with black and white ; in the Long Island one these markings are almost entirely obsolete. The markings of the anterior wings of the former species are more prominent and better defined, the ordinary spots are not so elongate, and are united by a short, thick neck, and the basal dash is shorter and thicker ; otherwise the markings are much the same.

The female of *riparia* presents a curious structure of the end of the abdomen, perhaps for the purpose of retaining the male ; the end of the abdomen is bare of scales, but near the tip there is a ring of rather long hairs, followed by a ring of stout curved spines ; such a structure is, so far as I know, unique in the Noctuidæ.

I have not been able to observe the female of *chandleri*, so that I do not know whether it is armed in the same way.

DESCRIPTIONS AND NOTES ON THE NOCTUIDÆ.

BY H. K. MORRISON, CAMBRIDGE, MASS.

Agrotis decolor Morr.

Proc. Boston Soc. Nat. Hist., vol. 17, p. 162.

Agrotis campestris Grote.

CAN. ENT., Oct., 1875.

Having received many additional specimens of this species, I am able to give below a fuller description than my original one, and to compare it with its two allies, *geniculata* Grote and *tessellata* Harr.

A. decolor can at once be distinguished from *tessellata* by the dark purple ground color, frequently overspread in the median and basal spaces with cinereous, and by the absence of any gray tint ; from *geniculata* the best character which I have observed to separate it is the color of the thorax, which in *decolor* is brown, having usually the prothoracic and metathoracic tufts yellow, and having always a yellow spot at the base of the tegulæ ; in the former the thorax is simply cinereous and black.

The following are its characters drawn from a large series of specimens from Maine, Canada, New Hampshire, New York and Massachusetts :

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Tibiæ spinose. Collar with a lobate central black line. Thorax usually brown, lighter than the wings, having frequently an anterior furrowed tuft and always a posterior tuft. Abdomen smooth, rounded, with the ovipositor of the female slightly exserted. Color of the anterior wings very variable, usually brown with a distinct purple tinge, occasionally the basal and median spaces are suffused with cinereous, and then the subterminal and terminal are dark and contrasting; in other specimens the wings are entirely purple black, in others purple brown, in still others the median space is dark purple brown and the basal and subterminal space bright even yellowish brown; this seems to be the most common form. The ordinary lines are distinct, black and geminate; the usual spots are shaped as in *tessellata*, the space between them is usually filled with black; a black line at the base of the fringe.

Posterior wings whitish or light gray, with a broad, black, marginal band; in the males this band is even and well defined; in the females usually suffuse.

Expanse 30–37 m. m.

I regard this as a northern mountainous species, belonging to the Canadian fauna.

Caradrina meralis, nov. sp.

Expanse 31 m. m. Length of body 13 m. m.

This is a comparatively stout, inconspicuously marked species, differing materially from *meskei*, *miranda* and *tarda*, the other species of the genus. Eyes naked. Tibiæ unarmed. Palpi black, tipped with white. Antennæ of the male pubescent. Front, vertex, collar and thorax gray. Abdomen untufted. Anterior wings grayish white; the markings black and quite faint; traces of the half-line; the interior line faint, oblique; exterior line rounded, obsoletely dentate; orbicular spot reduced to a black dot, the reniform forming a conspicuous luniform black mark; subterminal line absent; a partially obsolete series of black dots at the base of the fringes.

Posterior wings white, immaculate, except that the discal dot shows through from below.

Beneath gray, the anterior wings suffused with black, strong discal dots and a common median line, best marked on the costa.

Hab. Maine. Collection H. K. Morrison.

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Hadena fibulata Morr.

Bull. Buff. S. N. S., 1874.

I have specimens of this species from Maine and Canada, which offer considerable variation; it is probable that it should be referred to *Hadena* rather than *Dryobota;* it seems to be in a measure intermediate between the two genera.

Hadena norna, nov. sp.

Expanse 23 m. m. Length of body 15 m. m.

This is one of the small, slender species of *Hadena,* belonging to the little sub-genus *Oligia,* as defined by Mr. Grote.

Eyes naked. Antennæ simple. Thorax and abdomen smooth and untufted. Anterior wings light brown, shaded with darker brown in the basal, terminal and central portion of the median spaces; sub-basal space light; interior line simple, fine and distinct, forming three prominent lobes; orbicular spot absent; reniform present, situated in the centre of the median dark space, white and strongly contrasting; exterior line also simple and distinct, incepted on the costa before the reniform; a distinct costal shade before the inconspicuous subterminal line; a black line at the base of the fringe. Posterior wings yellowish gray, with a fine median line. Beneath the anterior wings are blackish, except along the costa and inner margin; the posterior wings are yellowish, both with a median line and the latter with a terminal shade. *Hab.* Maine. Coll. H. K. Morrison.

Easily separated from its allies by the conspicuous white reniform spot.

GRAPTA SATYRUS (Edwards).

BY C. W. PEARSON, MONTREAL, QUE.

On Dominion Day, while at Chateauguay Basin, I collected a number of larvæ which were found feeding on nettle. I secured them in my larva box, and took a quantity of the food-plant with me. When I reached home in the evening I was too busy to examine them carefully, and the next day I found that quite a lot of them had changed to chrysalids.

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Among those that had not changed were a couple of *P. atalanta*, and the rest were all *V. Milberti*, a great many of which were infested with parasites, and in a few days all that escaped these foes had changed. In about ten or twelve days they began to emerge, and on opening the box on the 13th, I was much surprised to find one specimen of this beautiful *Grapta* hanging from the empty case. I did not know what it was until I compared it with an example from California. On the 15th also, along with several specimens of *Milberti*, I found another in the box, and comparing both of them with my example from California, I cannot find any difference except that they are in better order. Chateauguay Basin is about fifteen miles south of here, and has never been visited much by collectors, but we have recorded from that locality three insects which have never been taken here (Montreal), viz., *A. bellona* and *E. columbina*, taken by Mr. Jack, and *G. satyrus*, taken by myself.

ANNUAL MEETING OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

The fifth annual meeting of the above society was held, according to announcement, in the Court House, in the City of Ottawa, Ontario, on the 22nd day of September, 1875, at 3 p. m. The reports of the officers were read, and a copy of the President's address promised to be placed at the disposal of the printing committee for publication.

The following officers for the ensuing year were then elected :

President—W. Saunders, London ; *Vice-President*—Rev'd C. J. S. Bethune, M. A., Port Hope ; *Secretary-Treasurer*—J. H. McMechan, London. *Council*—Wm. Couper, Montreal ; R. V. Rogers, Kingston ; J. Pettit, Grimsby ; J. M. Denton and E. Baynes Reed, London. *Editor of Entomologist*—W. Saunders. *Editing Committee*—Rev'd C. J. S. Bethune, M. A.; G. J. Bowles, Montreal ; E. Baynes Reed. *Library Committee*—W. Saunders, E. Baynes Reed and J. H. McMechan. *Committee on Centennial Exhibition*—W. Saunders, Rev'd C. J. S. Bethune, M. A., J. H. McMechan. *Auditors*—G. Geddes, Chas. Chapman, London.

The various reports of the officers and from the Branches of the Society will be found in the forthcoming Annual Report.

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THE USEFULNESS OF SPIDERS.

BY JOHN G. JACK, HILLSIDE, CHATEAUGUAY BASIN, Q.

I have often wondered why people have such a dislike for spiders, and why, instead of killing, they are not placed upon trees and plants, for they are exceedingly fond of a great many insects injurious to vegetation. I have seen them very busy devouring the interior of a chrysalis of Clisiocampa, and in winter, when out of doors, they generally hybernate under the loose bark of trees, in which case all the beetles and chrysalids in the vicinity are sure to be found destroyed, only the shells remaining. I notice that the Lady-birds (Coccinella) hybernate beside them in safety, and are never destroyed, living even within their webs. Whether this is a natural taste of the spider or an instinct I can only leave for Entomologists to determine; the fact however remains.

It is well to encourage any insect that can destroy the Clisiocampa, which is likely to cause great mischief the coming season if not destroyed in the rings. In our orchard of 1000 trees, my brothers and I have, after school hours, gathered by actual count about 8000 rings, and still can take off two or three hundred in an hour's time. We are paid a cent per dozen by father, and think it a good thing. The youngest boy is only five years old, and he has frequently gathered 60 or 70 rings after school, even in the short winter afternoons. "Eternal vigilance is the price of" —apples.

MISCELLANEOUS.

Correction and Errata.—The following was received from Mr. W. H. Edwards too late for insertion in our last number: "After the mss. of my paper was sent to the printer, I discovered that I had overlooked the fact that *myrina* is expressly enumerated by Hübner under his coitus *Argynnis*. Also, in reference to the same paper, the following errata: Page 193, lines 14 and 17, for 'class' read 'clan.'"

Pterophorus periscelidactylus.—On the morning of the 31st October, while the thermometer was several degrees below freezing, I captured a healthy specimen of this species. Was not that very late for it?—R. VASHAN ROGERS.

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Mr. J. M. Grant, of Crowelton, Buffalo, W. Nebraska, desires to arrange some exchanges with Entomologists in Ontario or Quebec. Parties desiring to exchange will please write him.

Mr. T. G. Schanpp, 25 Broadway, Brooklyn, E. D., N. Y., has many duplicates in Coleoptera from New York, Texas, Louisiana, Florida, &c., which he desires to exchange for specimens from the north; collects only in Cicindelidæ and Carabidæ.

Mr. W. V. Andrews, 36 Boerum Place, Brooklyn, N. Y., has a number of European, Australian and New Zealand Coleoptera, which he wishes to exchange for species purely Canadian or Arctic.

Mr. George P. Cooper, of Topeka, Kansas, has a large number of Western insects, which he would be glad to exchange for Canadian insects

BOOK NOTICES.

Remarks on Canker Worms and Description of a New Genus of Phalaenidæ, by Chas. V. Riley, 8vo., 8 pp., with eight wood-cuts. Through the kindness of the author we have been supplied with an advanced copy of the above paper, in which the many points of difference between *vernata* and *pometaria* are clearly pointed out; the differences in structure being sufficiently great to require, in the author's opinion, the erection of a new genus for *vernata*.

The Lepidopterist's Calendar, by Joseph Merrin, second edition, price 3s. 6d., published by H. Marsden, Gloucester, England. This is an excellent little work of 250 pages, giving the time when the various species of British Lepidoptera appear in the egg, larval, pupal and imago states, with the food plant and habitat, all thoroughly worked up to the present time. Mr. Marsden has appointed Mr. W. V. Andrews, 36 Boerum Place, Brooklyn, N. Y., as his American agent for the sale of this work.

Bulletin of the Buffalo Society of Natural Sciences, Vol. iii, No. 1. Contains Description of a New Crustacean, already referred to in our

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August No.; a paper on Texan Lepidoptera, by Dr. Leon F. Harvey; on New species of Eusarcus and Pterygotus, by A. R. Grote and W. H. Pitt, and Part II of Synopsis of Fungi of the United States, by M. C. Cooke, M. A.

The Structure and Transformations of *Eumacus atala*, by Samuel H. Scudder, 4to, 8 pp., with one excellent lithographic plate, from the Memoirs Bost. Soc. Nat. Hist. Notice of the Butterflies and Orthoptera collected by Geo. M. Dawson, as Naturalist of the B. N. A. Boundary Commission, 8vo, pp. 5, by Samuel H. Scudder. We tender the author our sincere thanks for copies of the above valuable papers.

The Scientific Monthly—a magazine devoted to the Natural Sciences; E. H. Fitch, Editor and Proprietor, Toledo, Ohio, Vol. 1, No. 1. This new claimant for public favor is an 8vo journal of 48 pages (the first number, owing to an accident, is only 40 pages). It contains several papers of interest to the Naturalist, among which we would especially mention "First Impressions of the Bird Fauna of California, by Prof. Robert Ridgeway." The subscription price is $3 a year in advance, or 45 cts. a number.

The Cincinnatti Quarterly Journal of Science, Vol. II, No. 4, October, 1875. The October number of this valuable quarterly contains two papers on Entomology, one on the Tineina of Colorado, by our esteemed friend and contributor, V. T. Chambers, of Covington, Kentucky; the other on Lepidopterous Larvae, by A. G. Weatherby. Mr Chambers is at present residing in Colorado, and his paper gives the results of personal observations on the Tineina of Colorado, many of which have been taken at altitudes of from 7,000 to 11,500 feet. In it he gives descriptions of twenty-two new species, besides references to others already described. These were all captured or bred from July 20th to Sept. 1st. Among others, Mr. Chambers has taken in this far distant locality *Œcophora borealella*, first described from specimens sent to him from London, Ont., by the Editor of this journal, and *Argyresthia goedartella*, hitherto known in this country only from specimens captured at Quebec by M. Belanger, thus proving a very wide range for these tiny creatures.

CANADIAN ENTOMOLOGIST.—Having had several of the earlier numbers of our journal reprinted, including index for Vol. I, we are now prepared to furnish full sets of our ENTOMOLOGIST, or any back numbers required.

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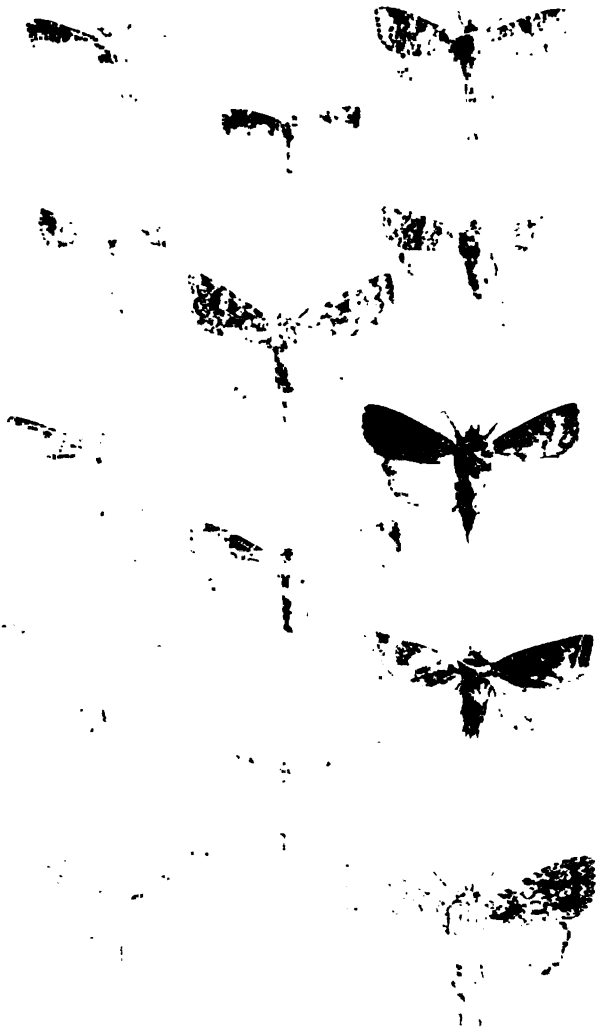

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The Canadian Entomologist.

VOL. VII. LONDON, ONT., DECEMBER, 1875. No. 12

LEPIDOPTEROLOGICAL OBSERVATIONS.

BY A. R. GROTE, A. M., BUFFALO, N. Y.

Director of the Museum, Buffalo Society Natural Sciences.

Nola ovilla, n. s.

♂. A small frail form with ciliate antennæ, no ocelli, and long, dependent palpi, their second joint thickly squamous. Fore wings grayish white, with the inner line black, fine, angulated. Outer line denticulate, followed by a pure white shade. A pure white shade in the place of the subterminal. Hind wings dusty white. Beneath the fore wings are pale fuscous, immaculate; hind wings whitish with a discal dot. Expanse 16 m. m. Canada, Mr. Saunders. This species differs decidedly from the N. Am. species described by Prof. Zeller; I do not find descriptions of N. Am. species in any other author.

Dilophonota merianæ Grote.

According to my correspondent, Mr. Meske, this species, formerly known from Cuba and Mexico, has been found in Texas by a collector and examples reared from larvæ. It must therefore be included in the List of our Sphingidæ.

Apatela tritona (Hübn.) Zutr., 107, 108.

Hübner's figure has the t. p. line more irregular and the hind wings more yellowish than the form we consider as intended. *A. grisea*, differs by the white hind wings, and is, *perhaps*, redescribed as *pudorata* by Mr. Morrison in the Annals of the N. Y. Lyceum. No comparison with *grisea* is made of his new species by Mr. Morrison. Specimens of *tritona* show the stigmata, and the inner edge of the reniform is perhaps included with the median shade in Hübner's figure. It is on a line with it in the specimens, which have also the small orbicular very faintly outlined and which latter may be indicated by the two dots in Hübner's figure. On the whole, I cannot see that Guenée's description of *tritona* differs from

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my material, and it is not clear that Mr. Morrison has identified a species more nearly resembling Hübner's figure than the ordinary identification of *tritona*.

Apatela grisea (Walk).

I have examined Mr. Walker's types in the British Museum, and I made the note: Fore wings like *tritona;* hind wings white. Professor Bélanger sent me a species which I considered to be this of Walker's. It now appears to me that Mr. Morrison has altered my determination and described the moth as a new species. I think that, until Mr. Walker's species is more satisfactorily identified, my own determination should not be interfered with.

I have since identified several of the species marked unknown to me in the "List" of 1874. A shorter compilation of the "List" is now published. It is no proof that the species is unknown now, that it was at that time. For instance, I have since identified *Schinia gracilenta*, and it seems to me that it is the same as *oleagina* Morr.; in my specimen the subterminal space is a little darker than terminal, as somewhat exaggeratedly shown in Hübner's figure; there is a faint discal discoloration beneath and traces of a subterminal line; the hind wings above are hardly "rosy" along exterior border. My specimen is undoubtedly the same species as Mr. Morrison's, and also came from my old school-friend Mr. Graef. I come to the conclusion that *oleagina* is not a var., but a synonym of *gracilenta*.

Apatela dentata, n. s.

♂. This is allied to *tritona* and *grisea*, but is a smaller species wanting all the black dashes. The ground color is blackish, shaded over with whitish. The lines black, single, denticulate. The claviform is indicated by a slight black mark. Orbicular obsolete. Reniform whitish, rounded, with its outward edge black-lined and shaded. T. a. line running in a little on median vein. T. p. line inaugurated above the reniform, running well outwardly, denticulate throughout its length. Subterminal line hardly apparent; a blackish shade over median nervules on the gray terminal space. Fringes gray preceded by blackish interspaceal markings. Hind wings fuscous, lighter towards the base, with indistinct line. Beneath much paler, irrorate, without discal marks and with a common shaded line.

Expanse 32 m. m. Quebec, Mr. Bowles.

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Mamestra Goodelli, n. s.

♀. Resembles at first sight *Hadena miselioides*, but the eyes are hairy, size smaller, and color more brownish. Fore wings shiny reddish brown, with the terminal space and costal region shaded with greenish. Collar greenish, edged with black. Thorax reddish with the tegulae dark margined. Transverse lines geminate, rather indistinct, slightly lunulate; t. p. improminently exserted. Orbicular small; reniform moderate, ill-defined, outwardly shaded with whitish. Subterminal line improminent; no W-mark. Hind wings fuscous with pale fringes; beneath with terminal space of primaries pale. A double exterior shading and discal point on secondaries; primaries fuscous, with the commencement of an angulated exterior line indicated on costal region and obscure discal point. Above the pale pre-apical costal points are noticeable. *Expanse* 30 m. m. Amherst, Mass.; from Mr. L. W. Goodell, after whom I name the species, and numbered 291.

The greenish or olive tintings of this species are difficult to localize and are very slight.

Dianthoecia lustralis, n. s.

♀. Resembles *Mamestra legitima;* allied to *Dianthoecia pensilis.* Lilac gray, the median space shaded with light reddish below median vein and about reniform. Median shade blackish, diffuse. Lines improminent, geminate, the pale included spaces noticeable; t. a. line outwardly exserted, narrowing the median space. Claviform marked by a short black oblique dash. Orbicular small, pale, distinct, rounded. Reniform narrow, pale, with an interior annulus. S. t. line below vein 6 preceded by a carneous shading, and followed by dark scales; inflected below vein 2. Fringes dark, obscurely cut with pale. Hind wings dark fuscous with paler fringes; the median line from beneath reflected. Under surface of hind wings paler than above, showing dot and line; fore wings fuscous with paler terminal space. Collar with a black line. Expanse 30 m. m. Racine (O. Meske).

Anarta promulsa.

Mamestra promulsa Morr., Ann. N. Y. Lyc., 1875, 97.

♀. This is rather a large species for the genus, but its characters are those of *Anarta*, and it is allied to *Anarta nivearia* Grote. A good example is in the collection of the Buffalo Society of Natural Sciences,

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...ed ... Colorado. -- The ... without mixture of ... size a little larger ... which species ... I suppose the ... with the other char-

... green, the median ... geminate with ... below which ... becoming medially ... Hind wings black with a ... medially along ... olive; abdomen ... fore wings with ... band black; ... Hind wings with ... along internal ... Expanse 24 ... dedicate the

... terminal claw. ... stained with a ... touched ... centre; orbi- ... the wing; the ... The narrow ... alternated ... like fore ... central line; ... and small ... black shade ... Mesa.

... with a perpendicular

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median yellow stripe which margins, below the median vein, outwardly, a broad subterminal plumbeous black band, running obliquely to costa before the apex and edged outwardly with a yellowish stain. Terminal space cut by a blackish line. In one specimen the plumbeous band is obsolete and there is nothing on the yellowish white primaries but the perpendicular yellow median stripe, narrowly edged with blackish below median vein, the rounded discal blackish reniform (which in the type is included in the plumbeous color and faintly edged with white) and some yellow apical shadings. Fringes white. Hind wings silvery white with fuscous terminal shade widening at apices. Beneath fore wings fuscous, whitish along costa and internal margin; hind wings white with the costa sometimes a little touched with fuscous and external margin obsoletely lined. Expanse 21 m. m. Texas, Mr. Belfrage, No. 112. Bastrop Co., Mr. Meske.

It has perhaps been confounded with *cretata*. *Cretata* is milk white; *binocula* yellow white, and the coloration of fore wings beneath gives distinguishing characters. The rounded reniform is a noticeable character and allies the moth to *candefacta*, than which it is a stouter species.

Spragueia guttata, n. s.

Allied to *dama* and *leo*, but strongly differing in the detail of the markings. The fringes are orange, touched with black at internal angle opposite the cell (as in *dama*) and at apices. The wing is broken up into sulphur yellow spots by the black lines and ground color. An orange median fascia extends upwardly to the disc before the yellow, black-circled, round reniform, and extends to apices beyond the spot. Internal margin touched with orange at base. Collar and tegulae orange; disc of the thorax yellow, marked out by black inner lines to the patagia and with two plumbeous spots. Hind wings blackish; abdomen zoned with pale yellow, beneath whitish with orange tip. Beneath the wings are blackish with faint lines; on primaries the orange fringes are marked with black as on upper surface. *Expanse* 16 m. m. Bastrop Co., Texas, Mr. Meske.

Spragueia fasciatella, n. s.

Allied to *to[illegible]icina* Zeller, and similarly sized, differing by the dull ochreous or paler color of the narrow fore wings, which have black fringes, and by the t. p. line being visible and preceded by a shade of a deeper tint than the ground color; the s. t. line is also preceded by a

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similar shade band. Black dots mark the stigmata; the rounded t. a. line is also followed by a darker shade. Variable in tone and distinctness of the three shade bands. Hind wings and under surface much as in *tortricina*. Texas, Belfrage, Nos. 125 and 126, July 6, 8.

Agrotis turris Grote.

Under this name, which I communicated to Mr. Norman before his leaving for Europe, I drew up the description from Canadian specimens (sent me by Mr. Norman), which has since been published under the determination "Cinereomacula Morr.," in the Proc. of the Phil. Acad. of N. Sciences. I made this alteration in the proofs because Mr. Morrison sent me a specimen of *turris* as his "cinereomacula," previously imperfectly described by him in the Boston Proceedings. Upon Mr. Morrison's request I sent him my specimens. On their return I am surprised to find that he declares his "cinereomacula" to be something different, and returns me my own specimens as *his* types under a *new* ms. name of *his*, thus suppressing my own prior designation for the species which I had previously communicated to him and had only abandoned in consequence of his own determination. The species will be known under the above name of *turris*.

Agrotis mimallonis Grote.

I have, through the kindness of my correspondents, been very recently able to compare my types of this species and *rufipennis* Grote. The names are synonymous, the latter name having been founded on a specimen with obliterate ornamentation. Both specimens are from New York, and I had returned Mr. Mead's type long previously to receiving Mr. Lintner's.

EXPLANATION OF PLATE.

The specimens illustrated on the accompanying Photographic Plate were taken at St. Catherines or Orillia by Mr. George Norman, of Cluny Hill, Forres, Scotland, and are interesting since they are mostly types of new species described in these pages. Their discovery is due to the scientific enthusiasm of Mr. Norman, who has spent two years in Canada to the benefit of Entomological knowledge and the pleasure of his North American friends.

The following is the explanation of Plate 1:

1. Parastichtis gentilis *(Grote)*. Male type.

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2. Parastichtis perbellis *(Grote).* Female type.

A second specimen has been since received from London (Mr. Saunders).

3. Parastichtis minuscula *(Morr.).* Female. Orillia, Mr. Norman.
4. Litholomia napaea *(Morr.).* Orillia.
5. Agrotis friabilis *Grote.* Type.
6. Agrotis campestris *Grote.* Type.

I am informed by Mr. Morrison that this is *Agrotis decolor*, Proc. Bost. S. N. H., 1874, 162. This was not readily perceivable from the remarks of Mr. Morrison, who compared his species with *geniculata* G. & R., whereas *campestris* is very close to *tessellata.* A specimen sent to Mr. Morrison after the Boston paper appeared was returned to me as a "var. of *tessellata*"; and without nearer determination, I accordingly described it, not agreeing with this determination, and am surprised to find it now stated to be "*decolor.*"

7. Agrotis (Matuta) Catherina *Grote.* Female type.
8. Agrotis (Pachnobia) Orilliana *Grote.* Female type.

This I am informed is *A. claviformis* l. c. This species belongs to Guenee's genus *Pachnobia.* Its short description in the Boston Proc. was additionally unintelligible, since "*claviformis*" is there compared to *sigmoides*, which latter belongs to a different group.

9. Agrotis versipellis *Grote.* Male type.
10. Apatela subochrea *Grote.* Type.

Allied to the European *salicis.*

11. Oligia versicolor *Grote.* Type.
12. Agrotis badicollis *(Grote).* Male. Orillia.
13. Crocigrapha Normani *Grote.* Type.
14. Agrotis rubifera *Grote.* Type.

I formerly incorrectly determined this last species as the same with the European *rubi.* Dr. Speyer has kindly compared it and finds our species different.

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AN ABSTRACT OF DR. AUG. WEISMANN'S PAPER ON "THE SEASONAL-DIMORPHISM OF BUTTERFLIES."

[LEIPZIG, 1875, PUBLISHED BY W. ENGELMANN.]

To which is Appended a Statement of Some Experiments made upon Papilio Ajax.

BY W. H. EDWARDS, COALBURGH, W. VA.

Dr. Weismann has lately published an account of certain experiments made by him during a course of years with a view to determine the facts relating to seasonal-dimorphism, and from them to deduce the reasons for the phenomena. As several North American butterflies are thus dimorphic, I have thought that the substance of Dr. Weismann's paper would be interesting to the readers of the ENTOMOLOGIST, it being too long to print in full. I have therefore written out the following abstract, following as closely as possible the language of the author. I have added a statement of my own experiments with *Papilio ajax*, the results of which confirm the theory advanced by Dr. Weismann as to the causes of the phenomena in question.

The phenomena of seasonal-dimorphism had been known for a long time, and had been established in the case of *Vanessa prorsa* and *levana* early in this century, *prorsa* being the summer, *levana* the winter form. Prof. Zeller ascertained that *Lycaena amyntula* and *L. polysperchon* were summer and winter forms of one species. Dr. Staudinger found *Anthocharis belia* and *ausonia* to have the same relationship. On his interest being excited by these cases, the author instituted experiments. At first he supposed that the difference in the butterflies might be of a secondary nature, having its foundation in the difference of the larvæ, which might be owing to the difference in the food plants of the winter and summer broods. But the most strongly dimorphic butterfly, *levana*, feeds on one plant only, *Urtica major*, and although the larvae show a pronounced dimorphism, the two forms do not alternate with each other, but make their appearance in every generation. He then experimented on the indirect influence of the seasons, but concluded that the cause of the phenomena did not lie here. It must then lie in the direct influence of changing outward conditions of life, those in the winter generation being undoubtedly different from those of the summer generation. There are

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two factors from which such an influence might be expected, temperature and length of development, i. e., the duration of the pupa period. The duration of the larva period may be neglected, as this is very little shorter with the winter generation (at least with the species used for experiment). Starting at this point, experiments were made with *levana*. From the eggs of the winter generation, which had emerged as butterflies in April, the author bred larvae, which, immediately after they turned to chrysalids, were put into an ice box, in which the temperature was but 8° to 10° R. (52° Fahr.) It appeared that this temperature was not low enough to have much effect, for when after 34 days the box was taken out of the ice chest, all the butterflies (about 40) had emerged. The experiment succeeded in so far that instead of the *prorsa* form to be expected under ordinary circumstances, most of the butterflies emerged as the so-called *porima*, i. e., as one of the intermediate forms between *prorsa* and *levana*, sometimes taken out of doors, and which more or less resembles *prorsa* in design, but has much yellow like *levana*. In the succeeding experiment the author placed the pupae directly in the ice house, where the temperature was 0 to 1, R. (33° Fahr.), and left them there four weeks. Of twenty butterflies fifteen emerged *porima*, and among these were three which looked exactly like *levana*, except that the narrow blue border line was wanting. Five butterflies of the lot were unchanged, but came out *prorsa*, and therefore were uninfluenced by the cold. From this it appeared that by four weeks of cold down to 0-1 R., a greater part of the butterflies inclined toward the *levana* form, and single individuals arrived at the same almost completely. Should it now not be possible to make the change complete, so that every one should have the *levana* form? But the author never succeeded in bringing this about. There were always some individuals which kept the summer form, others were intermediate, and but a few so changed that they looked like genuine *levanas*.

Experiments succeeded better with some of the Pierides, many of which show the phenomena of seasonal-dimorphism. In *P. napi* the summer and winter forms differ strikingly. Numerous individuals of the summer generation were set in the ice house immediately after becoming chrysalids, the cold being 0-1 R., and were left for three months, then brought (11th Sept.) into the green-house. Between 26th Sept. and 3rd Oct. there emerged 60 butterflies, which, without an exception, bore the characters of the winter form, most even in an uncommonly strong degree. But all did not emerge in the green-house, a part going over the winter, and emerging the winter form the next spring.

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The author repeatedly tried the experiment of changing the winter to the summer form by the application of heat, but always failed, and concludes that *it is not possible to constrain the winter generation to embrace the summer form.* He then goes on to state that *levana* has not only two generations in a year, but three, and is polygoneutic (coining a word to indicate the fact whether a species has one, two or more generations: mono-di-poly-goneutic, from goneuo, to produce). A winter generation alternates with two summer generations, and the last of these gives as the fourth generation of the year hybernating pupæ, which in the next April emerge as the first generation, and in the *levana* form. Such pupæ (of the fourth gen.) he many times, immediately on their reaching that stage, placed in the green-house. But the result was always the same; nearly all the pupae hybernated. In one instance only did a *porima* appear among them, all the rest being *levana.* But some of the butterflies emerged in the autumn, after 14 days in pupa. These were always *prorsa* except in one instance of *porima.* From these experiments it appeared that like causes (warmth) have different effects on the different generations of *levana.* With both the summer generations the high temperature induced always the *prorsa* form; with the third this happened but seldom and with single individuals, while the great mass kept the *levana* form unchanged. One might say that this has its foundation in the fact that the third generation has no inclination to hasten its emerging under the influence of warmth, but that by a longer duration of the pupa state must always come out the *levana* form. The cause of different behavior under like influences can lie only in the constitution, the physical nature, of the generation concerned, and not in outside influences. It distinctly appears that cold and warmth cannot be the immediate cause why a pupa emerges *prorsa* or *levana.* The explanation of the facts is given as follows: The *levana* form is the primary original type of the species. The *prorsa* form the secondary, produced by the gradual influence of the summer climate. Where we are able by cold to change individuals of the summer generation into the winter form, this rests upon a reversion to the original form, upon atavism, which, as it appears, is most readily called out by cold, that is, *by means of the same outside influences to which the original form was exposed through a long period of time,* and whose continuance has preserved to this day, to the winter generation, the primitive marking and color. The arising of the *prorsa* form the author imagines to have occurred as follows: it is certain that a so-called ice period existed during the diluvial period in Europe. This

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may have spread a true polar climate over our temperate zone, or perhaps a lesser degree of cold may have prevailed, with increased deposition of rain and snow. At all events, the summer was then short and comparatively cool, and the existing butterflies could only produce one generation in a year. They were all monogoneutic; *levana* had but the form of *levana*. When the climate gradually became warmer, a period must have come on in which the summer lasted so long that a second generation could be interpolated. The pupae of the *levana* brood, which had hitherto slept through the long winter, could now during the same summer in which they had hatched as larvae fly as butterflies. Only the brood which proceeded from these last hybernated. There had come to be a state of things in which the first generation grew up under very different climatic influences from the second. So considerable a change as now exists between the *prorsa* and *levana* forms could not have taken place suddenly, but must have done so by degrees. If it did arise suddenly, this would signify that every individual of this species possessed the power to take two different shapes according as it was subjected to warmth or cold. But the experiments have shown that this is not so, that rather the last generation has an ineradicable tendency to take the *levana* form which protracted heat will not alter, while both summer generations have a preponderating tendency towards the *prorsa* form, although they allow themselves frequently to assume the *levana* form in various degrees by lengthened influence of cold.

It seems to the author that the quoted result of his experiments may not only easily be explained by the supposition of a gradual climatic influence, but that this supposition is upon the whole the only admissible one. While by the changes from the ice period to that of our present climate, *levana* altered gradually from a monogoneutic to a digoneutic species, at the same time a sharper dimorphism stamped itself gradually upon it, which only arose through the changing of the summer generation, while the winter generation held fast to the primary shape and marking of the species. When the summer became still longer, a third generation could be interpolated, and the species became polygoneutic, and in this manner, that two summer generations alternated with one winter generation.

The theory explains why at the same time the summer generation was allowed to change, but not the winter one. The last cannot possibly return to the *prorsa* form, because this is much younger than itself. But

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when among a hundred cases one appears where a pupa of the winter generation, induced by warmth, completes its change (to *prorsa*) before winter, this is inexplicable. It cannot be atavism which here compels it in the direction of the emergence; but we see from it that the changes in the first two generations have already called forth a certain change in the third, which discovers itself in this, that under favorable circumstances single individuals assume the *prorsa* form. Or, as might also be said, the alternating transmission, which carries with itself the ability to take the *prorsa* form, as a rule remains latent in the winter generation, then with single individuals turns to a continuous transmission. It is true we have as yet no kind of insight into the nature of the process of inheritance, and therein the incompleteness of this explanation is marked, but we still know many of its outward forms of phenomena. We know that one of these forms consists in this, that peculiarities in the father will appear again not in the son, but in the grandson, or even further on; that, too, they may be transmitted latent. Let us suppose a peculiarity should be so transmitted that it always appeared in the first, third and fifth genera tions, and remained latent in the intervening ones. It would not be incredible that the peculiarity should exceptionally, that is, from a cause unknown to us, appear in single individuals of the second or fourth generations. But this agrees with the cases mentioned in which exceptionally single individuals of the winter generation took the *prorsa* form, only with the difference that here a cause—heat—appeared which occasioned the bringing out the latent characters; though in what way it exerts this influence we are unable to say. These exceptions to the rule are no objection to the theory. On the contrary, they give us a hint that where one *prorsa* generation had formed itself, the gradual insertion of a second might be facilitated by the existence of the first. It is not to be doubted that in the open air single individuals of the *prorsa* form sometimes emerge in September or October. But if our summer were lengthened by a month or two, these could lay the foundation of a third summer generation, just as a second is now an accomplished fact.

Dorfmeister (who formerly experimented on the effect of cold on pupae of butterflies) believes that he may conclude that temperature exerts the greatest influence during the turning into chrysalis, but nearly as much shortly after the same period; and this conclusion may be correct in so far as everything depends on whether in the beginning the formative processes in the pupa turned in this or that direction, the final result of which is the *prorsa* or *levana* type. When, however, one or the other

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direction has been taken, it may through the influence of temperature be accelerated or retarded, but cannot be any more changed. It is very possible that a period may be fixed at which warmth or cold might be able to divert the original tendency most easily, and it may exist in the first days of the pupa state.

If it be asked why in the analogous experiments with *napi* the reverting was always complete, we may suppose that with this species the summer form has not been so long in existence, and therefore will be more easily abandoned; or that the difference between the two generations has not become so distinct, which, moreover, indicates that here again the summer form is of younger origin. Or, finally, that the inclination to revert may be quite as great with different species as with different individuals of the same species. But at all events, the facts are confirmed, that all individuals will be moved by cold to a complete reversion. The opinion is expressed in reference to *prorsa*, that in these experiments it does not depend so particularly on what moment of the development the cold is applied, and that differences in the constitution of individuals are much more the cause why the cold brings these pupæ to a complete reversion and those to but a partial one, and has no influence whatever on others. Especially interesting in this relation is the American *Papilio ajax*. This butterfly, similar to the European *podalirius*, appears wherever it is found in three varieties, which are designated as var. *telamonides*, var. *Walshii*, and var. *marcellus*. Edwards has proved by experiments, breeding from the egg, that all three forms belong to the same cycle of development; of such nature, that the first two appear only in spring and always come only from over-wintering pupae, while the last form, var. *marcellus*, only appears in summer and that in three generations successively. There appears here a seasonal-dimorphism allied to common dimorphism. Winter and summer forms alternate with each other, but the first appears again in two forms, or varieties, *telamonides* and *Walshii*. Omitting for the present this complication, and looking at these winter forms as one, we have four generations, of which the first possesses the winter form; the three following, on the contrary, the summer form, *marcellus*. The peculiarity of the species lies in this, that with all these summer generations only a part of the pupae emerge after a short time (14 days), but another portion remain the whole summer and the following winter in the pupa sleep, in order to emerge only in the spring, and then always in the winter form. For example, of fifty pupae of the second generation which had formed

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chrysalids at the end of June, after fourteen days, forty-five *marcellus* emerged, but five remained over till the next spring and then emerged *telamonides*. The explanation of this fact follows very simply from the above stated theory. According to this the two winter forms must be considered as the primary, but the *marcellus* form as the secondary. But the last is not yet so firmly established as with *prorsa*, where a reverting of the summer generation to the *levana* form is only accomplished through special outside influences; while here there are in every generation single individuals with which the inclination towards reversion is still so strong that the extremest heat of summer is incapable of diverting them from their original hereditary disposition, to accelerate their emerging and to force them to take the *marcellus* form. Here it is indubitable that the old hereditary tendency is not restrained by different outside influences, but wholly by internal causes, for all the larvae and pupae of many different broods were simultaneously exposed to the same outside influences. If it be asked what significance belongs to the duplication of the winter form, it may be answered that the species was already dimorphic at the time when it had but one generation a year. Still this explanation may be gainsaid, for such a dimorphism is not elsewhere known, though indeed some species possess a sexual dimorphism in one sex—the female —as in the case of *Papilio turnus*, which has two forms, but not as is here the case, belonging to both sexes. And therefore perhaps another theory must be advanced. With *levana* we saw the reversion occurring in very different degrees with different individuals; only rarely it reached the genuine *levana* form, generally only succeeding in reaching part way, as far as the so-called *porima* form. Now, it would be at all events astonishing if with *Papilio ajax* the reversion were every where complete, as exactly here the inclination to revert is so different in different individuals. It might therefore be presumed that one of the two winter forms, indeed *telamonides*, is nothing else than an incomplete reverting form, answering to *porima* with *V. levana*. Then *Walshii* only would be the original form of the butterfly, and with this would agree the fact that this variety appears later in the spring than *telamonides*.* Experiments ought to be able to give the explanation. The pupae of the first three generations placed upon ice ought to give for the greater part the *telamonides* form, the lesser portion should be *Walshii*, and only a few, perhaps no individuals should emerge *marcellus*. And this may be assumed to be

* There is an error here, *Walshii* being the earlier form.—E.

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the result, from the view that the inclination to revert is great, that even with the first summer generation, which were the longest exposed to the summer climate, always a portion of the pupae, without artificial means, emerged *telamonides*, but another portion *marcellus*. This last will now become *telamonides* by the application of cold; the first, on the contrary, will wholly or in part revert to the original form *Walshii*. One would expect that the second and third generations would revert still more easily, and in greater percentage than the first, because these last had first taken the new form *marcellus*, but from the experiments so far made can no other conclusion be drawn. To be sure, of the first summer generation, only seven pupae out of sixty-seven over-wintered and emerged *telamonides;* while of the second generation forty out of seventy-six over-wintered; of the third twenty-nine out of forty-two. But for closer conclusions more extended experiments will be necessary.

After the experiments so far had, one might still incline to the supposition that through seasonal-dimorphism the outside influences working directly upon single individuals would force upon them one or the other form. But this is not tenable. That cold does not bring one and heat the other form follows from this, that with *ajax* each generation produces both forms. Further, the author often reared the last, or over-wintering generation of *levana* in the warmth of a room, and yet always got the winter form. The length of the pupa period does not determine in individual cases the form of the butterfly, or consequently determine whether the winter or summer form shall emerge, but the length of the pupa period is dependent upon the tendency which the growing butterfly has taken in the pupa. As a rule, the two winter generations of *ajax* emerge only after a pupa period lasting from 150 to 270 days, but single cases occur in which the period is no longer than with the summer form (14 days). With *levana*, too, occurs a similar phenomenon, for not only was the winter form forced to a certain degree by artificial warmth during the pupa period, but the summer generation produced many reverting forms without the period having been at all protracted. The half way reverting form *porima* was known long before any one thought of producing it artificially by the influence of cold. It appears in midsummer on the wing occasionally. * * * * If the explanation, then, is correct, the winter form is the primary and the summer form the secondary, and such individuals as embrace either naturally or artificially the winter form are to be considered as examples of atavism. It appears also that the individuals of a species are influenced by climatic change to

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a variable extent, so that the new form is made permanent sooner in one species than in another. From this there must follow a variability of the generations concerned, that is, single individuals of the summer generation must differ more widely in markings and coloring than is the case with those of the winter generation. The facts agree with this as regards *levana*, the winter form being much more constant than the summer, and in this *(prorsa)* it is hard to find two individuals exactly alike.

So far I follow the paper. After reading it I wrote Dr. Weismann as to the peculiarity noticed by me that while out of doors, in the early spring, *Walshii* was abundant, and for some weeks the only form of the species to be met, I had scarcely ever been able to obtain it by breeding, all the over-wintering chrysalids, with one or two exceptions, no matter from which generation, producing *telamonides*. In the Supplementary Notes to Butterflies of N. A., I had given the results of ninety-two over-wintering chrysalids from eggs of many broods of the three forms bred in 1871, and not one *Walshii* appeared, while that same spring, 1872, between the 11th and 29th of April, Mr. Mead, at Coalburgh, had taken sixty-three specimens of *Walshii*, and had taken or seen but one *telamonides*. To this Dr. Weismann replies: "The case of *Walshii* and *telamonides* is indeed very singular and not easy to explain. Nevertheless, I should believe that the ordinary warmth of the room in winter is the cause which prevents the chrysalids acquiring the perfect winter form *Walshii*. The case of *ajax* is more complicated than the other cases of seasonal-dimorphism. It seems now to me possible that not the form *Walshii* is the primary, but *telamonides*. It seems *telamonides* results from all generations. This primary form could have been changed by summer heat into *marcellus*, by winter cold into *Walshii*. But this would pre-suppose that *telamonides* has originated in the south and there resided at the time of the great glaciers."

Following the suggestions of Dr. Weismann, I have made experiments the past season on the chrysalids of *ajax*, having bred from eggs laid by var. *telamonides* the last of May many larvæ, from which resulted between 22nd and 26th June, 122 chrysalids. These as fast as formed were placed on ice in the refrigerator, in small tin boxes, and when all were formed were transferred to a cylindrical tin box, four inches in diameter and six high, and packed away in layers between thin partings of fine shavings. (I used shavings because no better substance was at hand, having found cotton liable to mould when exposed to dampness.) The box was set in a small wooden box, and this was put directly on the ice

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and so kept till 20th July. I had then to leave home for a few weeks and sent the box to the ice house, with directions to place it on the surface of the ice. I learned afterwards that this was not done, but that it was set on straw near the ice. By this means the influence of the cold was necessarily modified, and I doubt if the chrysalids within the box, from the manner in which I had packed them, were equally subjected to the cold, those on the outside certainly feeling its full effects, but those in the middle to a less degree, and perhaps so much less as not to have made the experiment of much value so far as they were concerned. I returned on the 20th of August and was informed that the ice in the house had just failed. The chrysalids had been subjected to quite a low temperature, and an equable one, while in the refrigerator for between three and four weeks, but from the defective packing had then probably not felt the cold in an equal degree, and they had been subjected to a lesser degree of cold in the ice house for five weeks longer, which also for some time must have been daily diminishing as the volume of ice decreased. That the severity of the cold was not sufficient to prevent the emerging of the butterflies was apparent when I opened the box, for there were discovered a number of dead ones, which had died as soon as they emerged, the wings being quite unexpanded. I threw out twenty-seven such, besides a number of dead chrysalids, and lamented that my experiment had failed, and that the work would have to be done over again next year. But one butterfly was alive, just from its chrysalis, and this I placed in a box in the house in order that it might expand. Here it remained forgotten till late at night, when I discovered that it was a *telamonides of the most pronounced type.* The experiment had not failed then. Early in the morning I made search for the dead and rejected butterflies, and recovered a few. It was not possible to examine them very closely from the wet and decayed condition they were in, but I was able to discover the broad crimson band which lies above the inner angle of the hind wings, and which is usually lined on its anterior side with white, and is characteristic of either *Walshii* or *telamonides*, but is not found in *marcellus*. And the tip only of the tail being white in *Walshii*, while both tip and sides are white in *telamonides*, enabled me to identify the form as between these two. There certainly were no *Walshii*, but there seemed to be a single *marcellus*, and excepting that all were *telamonides*.

The remaining chrysalids were now kept in a light room, and next day three *telamonides* emerged. By the 4th September fourteen of the same

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form in all had emerged, but as yet no *marcellus* or intermediate form After that date a few *telamonides* appeared at intervals up to 20th Sept., but a large proportion of the butterflies, namely, twelve out of twenty-six, between the 4th and 15th were intermediate between *telamonides* and *marcellus*, some approaching one, some the other more nearly. On 4th Sept. the first examples wholly *marcellus* appeared, and one followed on each day, the 6th, 8th, 13th and 15th; from the 15th to the 3rd of Oct. six out of ten were *marcellus*, and two intermediate; a single example between *telamonides* and *Walshii* appeared 3rd Sept., in which the tails were white tipped as in *Walshii*, but in size and other characters it was *telamonides*, though the crimson band might have belonged to either form. Up to the 20th Sept. one or more butterflies emerged daily, on one day, the 4th, eleven; after the 20th single individuals appeared at intervals of from four to six days, and the last was on 16th Oct. So that the whole period of emerging after the box was brought from the ice house was 57 days, and it had commenced some time before that occurred. The natural duration of the chrysalis state in such examples of *ajax* as emerge the first season is only about fourteen days, but in very rare instances in my experience single individuals have emerged after a period of from four to six weeks. In all, 50 butterflies emerged between the 20th August and 8th October, divided as follows:

Telamonides	22.
Between Telamonides and Walshii	1.
Between Telamonides and Marcellus, and nearest the former	7.
Between Telamonides and Marcellus, and nearest the latter	9.
Marcellus	11.

Great uniformity is observable in the size of all these butterflies, their average being that of the ordinary *telamonides*. The examples of *telamonides* especially are strongly marked, the crimson band in a large proportion of them being as conspicuous as is usual in *Walshii*, and the blue lunules near the tail are remarkably large and bright colored. Of the *marcellus*, in addition to the somewhat reduced size, the tails are almost invariably shorter than usual and narrower, and instead of the characteristic single crimson spot, nearly all have two spots, often large. In all these particulars they approach *telamonides*.

To the *telamonides* which emerged after 20th Sept. must be added most of the butterflies which were found dead in the box at that date, and this would bring the number to nearly fifty of that form. There remain of

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the original 122 chrysalids (several having died without yielding the imago), 28 chrysalids which are likely to go over the winter. In the experiments recited in But. N. A. as made with chrysalids of *ajax* in the summer of 1871, of several broods of *telamonides* the percentage of butterflies which emerged the same season varied from fifty to sixty, a few dying in chrysalis and the rest over-wintering. In 1870 the proportion of emerging butterflies was larger, but 28 is not an unreasonable number to overwinter out of 122. I conclude, therefore, that the butterflies which have so far emerged this season would naturally have done so, and that the effect of cold has not been to precipitate the emerging of any which would have slept till next spring. And as all which would naturally have emerged this season would have taken the form *marcellus*, the cold has completely changed a large part of these from *marcellus* to *telamonides*, and probably such were from the chrysalids which were subjected to severest cold. The intermediate examples have also changed, but not completely, owing to the lesser degree of cold applied, as before explained; and finally, it seems probable that several chrysalids experienced cold sufficient to retard their emerging and to stunt their growth, but not enough to decidedly change their form. These are the *marcellus*. As to the duration of the chrysalis period, extreme confusion has been produced, so that the emerging, instead of taking place at 14 days after the cold was lessened or withdrawn, as might have been expected, has been protracted through more than two months. In the case of *napi*, as related by Dr. Weismann, where the chrysalids were subjected to cold for three months and then brought into the green-house, the butterflies began to appear in 15 days (or about their natural period), and all that emerged that year did so in the next seven days. In every case the reversion to the winter form was complete; and those chrysalids of the lot which over-wintered all gave the same form in the spring. This it is probable the over-wintering chrysalids of *ajax* will do,—that is, they will give *telamonides* in the spring, and had the degree of cold applied been equal and constant the reversion would probably have been complete. *Telamonides* must be regarded as the primary form of the species. What the position of *Walshii* may be further experiments will perhaps determine.

I append a table showing the dates of emergence of these butterflies:

20th August	1 male		Telamonides.
21st "	1 "	2 females	"
22nd "		1 "	"

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24th August..			1 female		Telamonides.
29th "	..1 male				"
31st "	..		1 "		"
1st Sept.....			1 "		"
2nd " . ..			1 "		"
3rd "			1 "	betw'n Telamonides & Walshii.	
3rd " 1	"				Telamonides.
4th " 4	"		1 "		"
4th " 2	"	medium, n'r'st			"
4th " 2	"	"			Marcellus.
4th " 2	"				"
5th " 1	"		1 "		Telamonides.
5th " 1	"	medium, n'r'st			"
6th " 1	"				Marcellus.
7th " 1	"				Telamonides.
8th " 1	"				Marcellus.
8th "			1 "		Telamonides.
9th " ...1	"		1 "	medium, nearest	Marcellus.
13th " 1	"	medium, n'r'st			",
13th " 1	"	"			Telamonides.
13th " 1	"				Marcellus.
14th " 1	"		1 "	medium, nearest	"
14th " 1	"	medium, n'r'st			Telamonides.
15th " . ..1	"				Marcellus.
16th "			1 "		"
16th " 1	"				Telamonides.
18th " 1	"	medium, n'r'st			Marcellus
19th "			1 "		"
20th " 1	"				Telamonides.
24th " 1	"				Marcellus.
30th "			1 "		"
2nd October.			1 "		"
3rd "			1 "	medium, nearest	Telamonides.
8th "			1 "	"	"
16th "			1 "	"	"

RESULT :

Telamonides.....22	spec's.	11 male,	11 female.		
" partly Walshii.. 1	"	....		1	"
Medium, nearest Telamonides 7	"	....	5 male,	1	"
" " Marcellus 9	"	....	6 "	3	"
Marcellus.....11	"	....	5 "	6	"
50	"		27 "	22	"

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LIST OF SPHINGIDÆ AND ZYGÆNIDÆ OCCURRING ON THE ISLAND OF MONTREAL, P. Q.

BY F. B. CAULFIELD, MONTREAL, P. Q.

MACROGLOSSINI.

1. Sesia thysbe Fabr. Not common ; June.
2. Sesia uniformis Gr. & Rob. Not common ; June.
3. Amphion nessus Hubn. Rare ; June and July.

CHŒROCAMPINÆ.

4. Darapsa myron Walk. Common ; June, July.
5. Deilephila chamaenerii Harris. Abundant ; June.

SMERINTHINI.

6. Smerinthus geminatus Say. Not common ; June.
7. " excaecatus Smith. Not uncommon ; June, July.
8. " myops Smith. Very rare.
9. " modestus Harris. Rare.
10. Cressonia juglandis Smith. Not common ; July.

SPHINGINI.

11. Ceratomia amyntor Hubn. Common ; June.
12. Daremma undulosa Walk. Rare.
13. Sphinx chersis Hubn. Common ; June.
14. " drupiferarum Smith. Common ; June, July.
15. " kalmiae Smith. Common ; June, July. I took a specimen of this moth at sugar, July, 1873.
16. " luscitiosa Clem. Very rare ; taken by Mr. Knetzing.
17. " plota Strecker. Rare ; taken by Mr. Knetzing.
18. Agrius eremitus Hubn. Very rare ; taken by Mr. Knetzing.

AEGERIDAE.

1. Aegeria tipuliformis Linn. Not common ; July.
2. " cucurbitae Harris. I was given a specimen of what I take to be this species July, 1875. I unfortunately lost it, and cannot be positive.

Besides these, two other species have been taken here, but are not yet determined.

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THYRIDAE.

1. Thyrus maculata Harris. Rare, on bramble blossoms; June.

ZYGÆNIDAE.

1. Alypia octomaculata Fabr. Not common; June, July.
2. " Langtonii Couper. Rare; June.
3. Eudryas unio Hubn. Rare; July.
4. " grata Fabr. Not uncommon; July.
5. Scepsis fulvicollis Walk. Very rare; taken by Messrs. Couper and Pearson; June, July.
6. Ctenucha virginica Charp. Very common; end of June, July.
7. Lycomorpha pholus Harris. Not uncommon; August.

NOTES.—These are all the species that I have seen from this locality. Mr. Knetzing informs me that he found a larva of *Deilephila lineata* Fabr., but did not succeed in rearing it. Mr. Couper was told by a friend last season (1874) that there had been some large caterpillars on a tomato plot in the outskirts of the city. These were probably larvae of *Macrosila quinquemaculata* Haw. I am of opinion that when proper attention has been given to the larval stages of these groups, many species will be added to this list, and many species that we think are rare will prove to be comparatively abundant.

EXCURSION OF THE MONTREAL BRANCH TO CHATEAUGUAY BASIN, ON DOMINION DAY.

BY C. W. PEARSON, MONTREAL, QUE.

Those of the members who accepted Mr. Jack's kind invitation to visit him on Dominion Day, left town on Thursday, the 30th June. by the 5 p. m. train, for Lachine, where they took the boat and had a delightful sail up the Chateauguay River as far as the Basin, where they were met by Mr. Jack, who conducted them to his beautiful residence, where they were warmly welcomed by the rest of his family. After a delicious supper under the shade of the trees, the party amused themselves in pleasant conversation and in preparing sugar for the evening's

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work. As soon as it began to get dusk, a large number of trees were sugared, and in a short time afterwards moths began to fly in considerable numbers. After a fair evening's work, the party, after a pleasant conversation on Entomology and other subjects, retired to their respective chambers. In the morning, after having participated of the hospitality of their kind host in an excellent breakfast, they started out to inspect the orchad and grounds, and found everything in the most perfect order and free from insect pests, owing to the perseverance and attention that was paid to the collecting of the Clisiocampa rings; during the winter as many as 10,000 having been taken and destroyed, and after this enormous destruction a careful search was made for the caterpillars in the spring Mr. Jack deserves great praise for his attention to those pests, and I am sure he is amply repaid for his energy.

After a ramble through the orchard, the party started in skirmishing order across the fields. Nothing much was done until they got near the bush, when business began to be lively; quite a number of good things were captured. The morning was spent in the woods and fields, and in spite of a little shower that made the party seek shelter under some of the old trees, everything passed off well. A number of larvae were found feeding on the nettle, which were brought home and from which I have raised a lot of *V. Milberti*, *P. atalanta* and two of *Grapta satyrus*. After scouring the woods till noon, the party made their way back to Hillside, where they were again treated to a sumptuous repast, after which they reluctantly took leave of their kind hostess and started to inspect the Colorado beetle, which is doing great damage there. After examining a number of potato patches without success, we at last came upon the enemy. Only one specimen of the perfect insect was found, but the larvae were there in considerable numbers, and a hateful sight they are, covering the plants with their filthy excrements and stripping the stalks of their foliage. After killing a lot of them and bottling some for curiosity, we proceeded down the road leading through the Indian Reserve. This is a capital ground for a collector; insects of all descriptions abound on every side, and I am sure that if it was properly worked up, would yield a great many rarities.

When we arrived at Caughnawauga we found the boat waiting, and, bidding good-bye to Mr. Jack and thanking him for his extreme kind ness, we went on board, and in a short time were landed at Lachine, and thence to Montreal by train, where we arrived about 7 p. m., having enjoyed ourselves thoroughly.

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LIST OF LEPIDOPTERA TAKEN AT CHATEAUGUAY BASIN, JUNE 30TH AND JULY 1ST, 1875.

Papilio turnus Linn.
Pieris rapae Linn.
Colias philodice Godart.
Danais archippus Cram.
Argynnis cybele Fab.
" aphrodite.
" myrina.
Phyciodes tharos Boisd. & Lec.
" nycteis.
Grapta comma.
" progne Cram.
Vanessa Milberti Godart.
Pyrameis atalanta Linn.
Limenitis arthemis Drury.
Euptychia eurytus Fab.
Lethe portlandia.
Pararge Boisduvallii Harris.
Lycaena comyntas Godart.
Eudamus tityrus Fab.
Thorybes pylades Scudd.
Hesperia zabulon Boisd.
" leonardus Harris.
" peckius Kirby.
" mystic Scudd.
" taumas.
Ctenucha virginica Charp.
Euchaetes collaris Fitch.
Thyatira expultrix Grote.
Mamestra nimbosa Guen.
Hadena destructor Grote.
" arctica.
" xylinoides Guen.

And several others not yet determined.

BOOK NOTICES.

THE AMERICAN NATURALIST.—This valuable journal has changed hands, and will in future be published by Messrs. H. O. Houghton & Co., Riverside Press, Cambridge, Mass., under the editorial management of A. S. Packard, Jr., assisted by other eminent men of science. The amount of reading matter in each number is to be increased from fifty-six to sixty-four pages.

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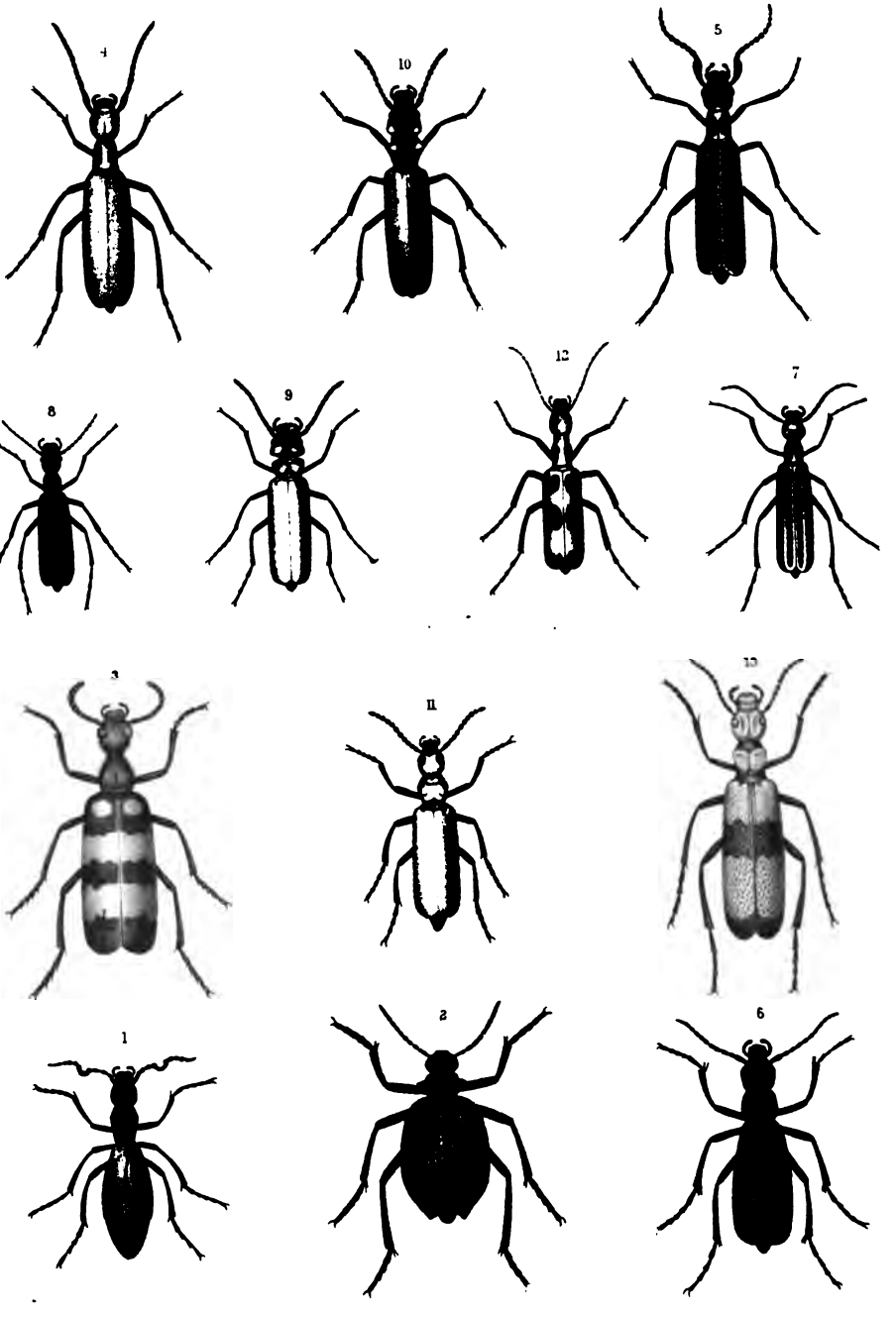

1. Meloe angusticollis Say.
2. Cysteodemus armatus Lec.
3. Mylabris cichorii Linn.
4. Macrobasis albida Say.
5. Macrobasis atrivittata Lec.
6. " " segmentata Say.
7. Epicauta vittata Fab.
8. " " cinerea Forst.
13. Tegrodera erosa Lec.
9. Cantharis vesicatoria Linn.
10. " " vulnerata Lec.
11. " " nuttalli Say.
12. Pyrota mylabrina Chev.

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The Canadian Entomologist.

VOL. VIII. LONDON, ONT., JANUARY, 1876. No. 1

ANNUAL ADDRESS

OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO, 1875.

To the Members of the Entomological Society of Ontario:—

GENTLEMEN,—For the fifth year in succession I find myself called upon, as your President, to address a few words to you on the condition of our Society, and on the subject of Entomology in general.

With regard to the Society, you have already learnt from the satisfactory Reports of the parent organization and its various Branches, that it continues to go on prospering in a quiet, unostentatious way. While there has been no marked increase to our list of members during the past year, and no performance of any work of unusual importance, yet it is a matter of congratulation that we have no falling off either in numbers or resources to deplore. Much of the inactivity in Entomological matters that has been apparent in this country during the past year may no doubt be ascribed to the prevalent "hardness of the times," which has occasioned—even to those least affected by it—much anxiety of mind, conjoined very often with increased absorption in the cares of business or in the labours necessary for obtaining a livelihood. As you are well aware, we have in Canada but very few persons of assured wealth, who are able, as in older and richer countries, to devote their abundant leisure to literature, art or science. Consequently the condition of things in the world about us deprives most of our members of the leisure, if not also of the inclination, requisite for the successful pursuit of Entomology in any of its various phases. Before another winter opens upon us, however, we have reason to believe that the worst of the present financial storm will be over, and that renewed confidence and prosperity throughout the country will remove the gloom and dulness now oppressing almost every department of work among us. With a revival of business, we may assuredly look for a restoration of activity in scientific pursuits, and hope that our Society, in common with others of a kindred character, may be distinguished by large accessions to its numbers, and by increased work in all its departments.

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Last year, at our annual meeting, I took the opportunity of calling your attention to many fields of Entomological labour that are now all but unexplored in this country. May I repeat that there is ample scope for the exertions of all our members, whether they care only to form collections of specimens, or prefer to devote their labours to the unfolding of the life-histories or the study of the classification of insects? There is plenty of work remaining to be done even in the favourite orders of Lepidoptera and Coleoptera, to say nothing of the others that are not so generally studied or collected. It would be a valuable contribution to our store of knowledge were lists of the Canadian species of all orders of insects to be formed, and presented to the Society for publication; and at the same time a revision made of those published some years ago.

But not only is there scientific work of this kind to be performed, which will require generations for its complete achievement; there comes before us at the present moment an extraordinary object for accomplishment during the approaching winter—I allude to the representation of the Society by means of a collection of Canadian insects at the approaching Centennial Exhibition at Philadelphia. You will all, I think, agree with us in the belief that it is a matter of great importance to the Society that it should be brought in this way before the notice of the world, and that it cannot but be of some benefit to the Dominion that its Natural History, as well as its industrial resources, should be fully exhibited. The Council of the Agricultural and Arts Association have already, on our behalf, brought the matter before the Commissioners appointed by the Government, and we understand that a sum of money will be provided to aid us in the satisfactory performance of the work. To gather together a fitting collection of insects, and to prepare them for exhibition, is a task that will strain to the utmost all the resources of the Society. We have commenced the work relying upon the co-operation of you all, and now we trust that every one will help us by the loan of specimens and any other aid that can be afforded. The Society is committed to the task; let us see to it that there be no failure!

Before turning from matters immediately affecting our Society, I may mention that our periodical, THE CANADIAN ENTOMOLOGIST, continues to be maintained with undiminished efficiency and interest, being largely supported and contributed to by our Entomological brethren of the United States; and that the last ANNUAL REPORT presented by the Society to the Legislature has been received with more than usual marks of favour by the press, scientific, agricultural and political, not only in

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Canada and the neighbouring States, but also in England; we have been naturally gratified to observe that in many instances copious extracts have been made from its pages, and even a whole article reprinted in an English scientific magazine.

Having referred thus far to our Society and the things that especially concern it, let me now say a few words regarding Entomological matters in general. At the Annual Meeting of the American Association for the Advancement of Science, held in August last, at Detroit, Michigan, the general Entomological Club, organized last year at Hartford, met for the first time. Its sessions, held daily throughout the week of meeting, were remarkably interesting. They were presided over by Dr. LeConte, undoubtedly the greatest of living American Entomologists, and were attended by a great majority of the noted Entomologists of this continent. Our own Society was most efficiently represented by our able Editor, Mr. Saunders; I much regret that the pressure of business matters at home prevented me from accompanying him, as I fully intended to have done. As a complete report of the proccedings is being published in the CANADIAN ENTOMOLOGIST, I need not detain you by any account of them here. Next year the meeting is to be held at Buffalo, N. Y.—a place even more convenient of access for Canadians than Detroit. We trust that a large number of our members will avail themselves of this opportunity—which may not occur again for many years to come—of attending the sessions, and making the personal acquaintance of our American brethren. From past experience I can assure them of a hearty welcome, while no one can doubt that more valuable information can be acquired in a few days in an assemblage of this kind than can be obtained in years of solitary work.

During the season that is now all but brought to a close, there has occurred nothing of a very startling or unexpected character. The Colorado Beetle has continued to extend his ravages throughout our country, but he has been met by such a determined and universal resistance that his work of devastation has been hardly appreciable; certainly in the central portion of this Province we have never had a finer crop of potatoes both as regards quantity and quality. The Cabbage Butterfly *(Pieris rapæ)*, to which I also referred last year, has been rapidly extending to the west, and has already become a common object in the neighbourhood of London. So closely, however, does its parasite *(Pteromalus puparum)* follow in its wake, that where a year ago it was most destructive to all its food-plants, it has this season wrought but a

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moderate amount of danger. The Locusts, or Grasshoppers, of the West (*Caloptenus spretus*), have continued to commit much havoc, though not by any means on the frightful scale of last year; there is every prospect that the destitution and suffering then occasioned by them will not be repeated to any very great extent this year.

While there has been upon the whole a decided diminution in the amount of loss occasioned by noxious insects during the past year, we have nevertheless to record an increase in the numbers and consequent power for evil, of several common species that are always more or less abundant; among the most notable I may mention the Army Worm (*Leucania unipuncta*), which has wrought much damage in the Maritime Provinces of the Dominion, as well as in some portions of the United States; the two species of Tent-Caterpillars (*Clisiocampa Americana* and *sylvatica*), which have been excessively abundant and destructive to fruit and forest trees in many parts of this Province; and the Pea Weevil (*Bruchus pisi*), which we much fear may soon become—unless measures are taken to prevent it—a source of great loss to our agriculturists. These I mention as having had a more than usual manifestation this year, but I need not detain you with any account of the ordinary work of our insect friends and foes, which are so familiar to every one in this country.

As I mentioned at the outset, you have done me the great honour of electing me your President for five years in succession; while I thank you most cordially for your kindness and consideration so repeatedly shown to me, I feel that it is only reasonable that I should now make way for some one else, who may be able to devote more time and energy to the interests of our Society, and be of more real use to it than I have latterly been capable of. I beg, therefore, to resign into your hands the office that you have so long honoured me with; at the same time I desire to say that I shall continue always to have the welfare of the Society at heart, and that I shall ever be ready and willing to do all that lies in my power to advance its best interests. Again offering you my respectful thanks,

I have the honour to be, gentlemen,

Your obedient servant,

CHARLES J. S. BETHUNE.

Trinity College School, Port Hope, September, 1875.

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NEW TEXAN MOTHS.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Parasa incisa, n. s.

♂. This species has the fore wings and thorax of a soft brown. The primary is covered by a pea-green patch, which does not reach the margins and is defined outwardly by a narrow dark line running once deeply inwardly below vein 2 and slightly opposite the cell. Hind wings light yellowish. It appears to be allied to *paenulata* Clem., unknown to me, but differs by the shape of the green patch and in its not being bordered with white. The thorax in *P. chloris* is grass green. Expanse 21 m. m. Bosque Co., Texas (Belfrage, No. 554.)

Euerythra phasma, n. g. et sp.

♂. The insect is allied to *Spilosoma*, but the head is more prominent, the wings narrower and the antennæ more continuously pectinate. The neuration has not been studied of this form, which is so distinctly marked as to be at once recognized, and which I do not find in authors. White. Fore wings white, crossed by a broad irregular blackish band from base to extremity of veins 3 and 4, where it retains the otherwise white fringes. From apices to middle of external margin a second band diagonally crosses the wing. A discal black spot and traces of an extra basal band. Everywhere, where the blackish color obtains the veins are bright yellow, as is the submedian fold. Body above crimson whitish at base. Thorax and head above white. Squamation about the eyes crimson. Anterior legs fuscous outwardly; palpi fuscous. Beneath, the white secondaries show a dot. Expanse 38 m. m. (May 5, Belfrage, No. 471).

Litodonta, n. g.

Allied to *Heterocampa* of Doubleday. It differs by the antennae being pectinate in both sexes. The thorax is more brushily tufted behind; the head more appressed; the abdomen shorter.

Litodonta hydromeli, n. s.

♂ ♀. Fuscous, overspread with pale green on primaries and thorax. Basal and sub-basal spaces powdered with orange scales; subterminal line followed by orange scales. Lines distinct, widely geminate, sinuate,

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sub-lunulate; space beyond the black discal streak clear fuscous. Fringes pale cut with fuscous, opposite the ends of nervules; terminal line distinct. Hind wings pale at base, smoky outwardly; beneath fuscous, with distinct terminal lines and fringes cut with fuscous. Thorax lined with black on tegulæ and collar. Expanse 34 m. m. May 7, Belfrage, No. 246.

I describe the type of this genus, the only one of the species which has the orange shadings. A paper is being prepared with a plate of the species, which are difficult to separate without illustration.

Aletia hostia, n. s.

Smaller than *argiliacea*. It differs by the stigmata being expressed by white dots, of which two super-posed, express the reniform. The ordinary lines are very narrowly white margined, appearing guttate. Hind wings blackish; fore wings darker than in *argillacea*. The t. p. line is at first sight more distinct than in its common ally. Easily recognized by the above characters. Belfrage, No. 535.

Caradrina conviva, n. s.

A small species of the size of *grata* (*rasilis* Morr.) Palpi black at the sides. Pale yellow brown, or fawn color. Lines dotted. T. p. line widely geminate. Subterminal line a blackish shade. Fringes blackish T. a. line incomplete, strongly dentate. Reniform ill defined; a blackish shade above it on costa indicates the median shade; a dot indicates the orbicular. Terminal line black, interrupted. Hind wings white, glistening, immaculate, beneath stained along costal region and above here a little tinted. Thorax and head above like fore wings, abdomen pale. Expanse 21 m. m. Belfrage, No. 539.

Mamestra brachiolum, n. s.

♂ ♀. Very near the Californian *M. cuneata* Grote, differing as follows: There are no yellow shades beyond the subterminal line, which is more distinctly waved in the female: the claviform is present, absent in its ally; the thorax is purely fuscous and the whole insect darker than in the Californian species; in the male at least the orbicular is more rounded, the t. p. line is straighter, not inwardly bent below the median vein, hence the lines are inferiorly wider apart than in *cuneata*. Else the two species are very similar. *Expanse* 28 m. m. Belfrage, No. 102. In this species the ovipositor is concealed as in *cuneata*.

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Catocala Belfragiana Harvey. Bull. B. S. N. S., 2, 281.

I learn that this species is the same as *C. jocaste* of Mr. Strecker. My paper was read Feb. 5th, and printed in February. I do not think as early a date can be shown for the Number of Mr. Strecker. This species extends to Kansas (Prof. Snow); I have vainly tried to identify it with the unknown *messalina* of Gueneé.

NOTES ON BISTON URSARIA WALKER.

BY G. J. BOWLES, MONTREAL, P. Q.

This moth, which is very common in and about Montreal, is described by Walker, in a paper by W. S. d'Urban, published in Vol. 5 of the *Canadian Naturalist* (1860), entitled "A Systematic List of Lepidoptera Collected in the Vicinity of Montreal." It is also taken at Quebec, but I met with only two specimens there during several years' collecting.

The following is the description (of one sex only):

"Male. Dark cinereous, speckled with black, very robust and pilose. Antennae very broadly pectinated. Thorax with three black bands. Legs densely tufted. Fore wings with four black oblique lines, first line bent, second and third approximate, slightly undulating, diverging towards the costa, fourth diffuse. Hind wings with first line obsolete, second and third apparent, fourth indicated by a short broad streak near the interior angle. Length of body 8—9 lines; expanse 22—24 lines."

The female is generally larger, less distinctly marked, and the wings are more transparent. Antennae filiform.

The English species *(B. histaria)* stands on our list as a native of Canada, but I have not met with it. The habits of the two species are very similar, and the caterpillars resemble each other closely; indeed, were it not for the difference in color and markings between the perfect insects, they would no doubt be considered identical. The description of the larva of *histaria* given by Newman, in his "Natural History of British Moths," would answer equally well for that of *ursaria*, and its

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habits are similar to those of the latter. It sometimes occurs about London in such numbers as to strip the trees of their leaves, and the moths are taken in the squares of that city, sometimes twenty or thirty on one tree.

The Champ de Mars, Montreal, is a favorite breeding place of *ursaria*. The Lombardy Poplars growing in this locality are infested with them year after year. In some seasons the trees are partially defoliated by the larvæ, and during the last week of April and the first of May the moths are to be found in great numbers. This year they were a little later than usual. On the 5th May I first observed them, many having just emerged from the pupa, and resting on the tree trunks with unexpanded wings. On the 6th I brought home two females, and placed them in boxes to obtain the eggs. Two days afterwards each had laid about two hundred eggs of a bright green color, globular, and without markings under a low microscopic power. They were .04 in diameter, and laid (in each case) principally in the narrow opening between the lid and side of the box. The female has an ovipositor which can be extended at least a quarter inch, for the purpose, perhaps, of laying her eggs in the interstices of the bark, as they are deposited some time before the leaves expand. About the nineteenth day the eggs changed color, and became steel blue. On the 29th May they began to hatch out, just as the poplars were expanding their leaves. The larvae were very active, and from the first had the peculiar geometric habit of resting now and then with the body extended full length in the air, supported only by the claspers. I turned them out on a young plum tree, and they soon began to feed freely, and grew rapidly. Strange to say, they quickly diminished in numbers, and but few reached maturity.

New-born larva.—.12 inch long, black, head large, with a few whitish hairs; front edge of first segment bordered with white, second and third with white spiracles; next five segments have two white spots on back, one on each side around spiracles, with another white spot below. Legs black; body beneath black.

Mature larva.—2 to 2.50 inches long, general color drab or dingy purple; head of a lighter shade, and spotted with black. First segment bordered in front with a yellow line, indented behind; fourth to eighth inclusive, each with six very small yellow tubercles, two on back, one behind and one below each spiracle. Body striped from head to tail with twelve reddish lines, each bordered on both sides by an irregular

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narrow black line; six of the reddish lines are on the back and sides, one (interrupted) through the spiracles, and four on abdomen. Anal segments spotted with black, as also first, second and third segments. Mouth pinkish, legs pink, spotted with black; spiracles dark colored.

It will be seen that the larva changes but little during growth. At the end of July they descend and bury themselves in the earth, changing in a few days to pupae, without forming any case. The pupa is brown, rather stout in form, and furnished at the tail with a small spine, which is generally bifid. It much resembles that of *Amphidasys cognataria*.

NEW SPECIES OF ACRIDINI FROM NEBRASKA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Pezotettix junius, n. s.

Frontal costa slightly sulcate below the ocellus in the ♂. Merely depressed at the ocellus in ♀.

Median carina of pronotum slight, cut by the last transverse incision behind the middle, the anterior part slightly arcuate. Lateral carinæ distinct only on the flat posterior lobe. Pronotum with sides slightly divergent; obtuse angled behind. Elytra cover about two-thirds of the abdomen. Posterior femora as long as abdomen. Last segment in ♂ squarely produced. ♂ cerci broad, short, rounded at tip, slightly curved on upper edge. The lower edge bends upward, making an obtuse angle about the middle, from which point the cerci rapidly decrease in width.

Color of living insect—Varies with age from gray to green. Face and sides of thorax greenish gray. A broad black stripe from eye to last transverse incision of pronotum. Occiput brown. Pronotum brown with green stripe on each side. Antennae red, tips brown. Elytra brown, sometimes yellowish, with a few black dots along the disk. Hind femora light brown, usually with two oblique whitish bands on upper half. Three black spots on upper edge. Tip black. Inner side and lower sulcus light green. Abdomen greenish gray, with a row of large black spots on each side, sometimes forming an almost continuous longi-

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tudinal stripe. Abdomen sometimes mottled with black above, is greenish yellow below, with a narrow black line on the last segments below the fold. Sternum and anterior legs tinged with blue. Hind tibiae pale red with black spines. In the male the posterior segments of the abdomen are margined anteriorly with black.

Length of ♀ .90 inch; elytra, .45 inch. Length of ♂ .80; elytra .40. Appears in June at Glencoe, Dodge Co., Nebraska.

Pegotettix autumnalis, n. s.

Frontal costa prominent above, suddenly widened and sulcate at the ocellus. Head unusually large, wider than thorax, occiput very long. Foveola of vertex shallow. Median carina ot pronotum slight, cut once behind the middle. Sides of pronotum nearly parallel. Elytra short, oval, pointed. Abdomen rather long and slender, extending beyond the tips of hind femora in ♀. Male cerci nearly straight, broad at base, apical half slender and pointed. Tip of abdomen pointed entire.

Color of dried (not alcoholic) specimens—Face brown, white mottled with brown below clypeus. Cheeks yellow and brown. Antennae rufous. A black stripe from eye to last lobe of pronotum. A yellow spot below the black stripe. Remainder of pronotum brown, hind lobe lightest. Occiput brown margined with yellow. Elytra dark brown, unspotted. Abdomen dark above. Anterior legs yellow, marked with red above. Posterior femora yellow at base, then red on both sides and below, but heavily marked on upper side of exterior face with fuscous. Posterior tibiae blue.

Length of ♀ 1.10 inch; elytra .25 inch. Length of ♂ .85 inch; elytra .203 inch. Glencoe, Nebraska, in September.

Pezotettix alba, n. s.

Form—Frontal costa sulcate, extending across clypeus in living specimens. Foveola of vertex hexagonal, shallow. Median carina of pronotum distinct, cut by last transverse impression back of the middle. Lateral carinæ rounded, nearly parallel. Elytra cross third abdominal segment in ♀. Wings minute. Legs long and slender. Male cerci long and slender. Terminal segment of abdomen entire acuminate. In the male the antennæ are longer than head and pronotum, and the posterior femora pass the abdomen one-fourth of their length.

Color of living insect—♂, vertex, disk of pronotum and legs bright green. Face, abdomen and under side greenish white. Elytra a little

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darker. A white stripe from top of eye follows the lateral carinæ to the end of pronotum, and extends obliquely down the side to insertion of posterior femora. Below the white stripe, and running parallel with it, is a broad band of green followed by another white stripe.

Color of ♀ vertex, disk of pronotum and legs white, mottled with green. Rest like ♂, but much whiter. Antennæ light brown.

Length of ♀ .85 inch; elytra .02 inch. Length of ♂ .65 inch.

Taken in August and September at Glencoe, Dodge Co., Nebraska.

Caloptenus lurida, n. s.

Size and form much like *C. occidentalis* Thos. Frontal costa with slight depression at ocellus, not sulcate. Foveola of vertex shallow, elongate, broadest in ♀. Median carina of pronotum slight, transverse impressions distinct. Lateral carinæ slightly divergent. Antennae longer than head and pronotum. Posterior femora as long as the abdomen. In the male the cerci are broad and flat, considerably curved and armed posteriorly with a rather long and sharp lateral tooth, giving them about the shape of the letter Y. Last ventral segment entire. In color this species, when living, is dark bluish gray. The pronotum and upper part of the head are sometimes lighter and tinged with red. Labrum bright red; antennae red at base, rest fuscous. Posterior femora light gray, with a longitudinal black stripe the entire length of the disk, and three black spots on the upper edge; the two posterior ones uniting with the black stripe and extending over upon the inner face. Tip black above, red below. Posterior tibiae blood red, with black spines.

In some specimens a light stripe on the side from base of elytra to posterior femora is apparent, but it is usually indistinct. Elytra cinereous darkest at base, with a central row of fuscous spots.

Length of ♂ .85 inch; of ♀, 1.05 inches.

Habitat, Dodge Co., Nebraska. Time of occurrence, September.

Caloptenus regalis, n. s.

♀. Size medium. Frontal costa prominent; not sulcate, but depressed at the ocellus. Top of the head raised slightly above the pronotum. Antennae longer than head and thorax. Disk of pronotum gradually ascending toward median carina. Lateral carinae rounded. Pronotum depressed and cut near the middle by the last transverse incision. Hind border obtuse angled.

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Color of living insect—Face bluish white, mottled with brown. Cheeks blue, with an oblique darker patch. Eyes prominent, dark brown, hind margins dotted with black lines. Occiput with a triangular black spot, apex forward, bounded on each side by bright yellow. Sides of the thorax margined anteriorly with yellow. A black stripe behind the eye runs backward to the last transverse incision of pronotum. Below this stripe the sides are purplish blue, marked posteriorly with red. Disk of pronotum brown, margined with blue. Elytra gray, darkest at base. Disk white, containing a row of large black spots. Similar but smaller spots unequally distributed over the rest of the elytra. Apex dusky. Wings transparent, with white veins. Posterior femora externally red, with three oblique black bands. Inside and lower sulcus bright red. Upper edge bluish gray, with three broad black patches. Apex gray above, white outside, blue within, and marked with the usual black crescent-shaped patch. Hind tibiae bright blue, with a narrow white annulation near the knee. Tarsi blue above, white below. Anterior legs yellowish, mottled above with blue. Abdomen white, with the anterior part of each segment red, and a small black spot on each side. Beneath bluish white. Antennae light brown.

Length about one inch; length of elytra, .80 inch; length of hind femora, .55 inch. *Habitat* Glencoe, Nebraska. Appears in latter part of June.

SUGARING FOR MOTHS.

BY O. S. WESTCOTT, MAYWOOD, COOK CO., ILL.

The various preparations which have been recommended by different writers seem to be successful enough in attracting nocturnal Lepidoptera, while the poisons employed for quieting them seem to fail in one or more essential particulars. Cyanide of Potassium, whether alone or prepared with Plaster of Paris, does not act with sufficient readiness to prevent strong-bodied moths from fluttering so long as in a great measure to spoil the beauty of their vestiture, while the application of chloroform at night is attended with considerable inconvenience. I have found a plan like the following to work best in practice.

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Have not less than four wide-mouthed bottles, two of them of sufficient size to be placed over any Catocala without rubbing him. Have each of these last provided with a large, well-fitting cork, to the bottom of which firmly tack a small piece of sponge. This sponge is to be moderately supplied with chloroform. The other bottles are to be filled for one-fourth of their depth with small fragments of Cyanide of Potassium, thoroughly covered with plaster of Paris in the usual way.

A hunting-coat which is provided with numerous pockets will be found a great convenience, the chloroform bottles occupying the side pockets, and the Cyanide bottles the hip pockets. For the completest success a dark lantern is almost indispensable. This should depend from a strap passed around the waist, so that both hands may be left free for purposes of manipulation. The moths are with no difficulty covered by the chloroform bottle, the effect of the chloroform being almost immediately apparent. Then the moths thus temporarily anaesthetized are transferred to the Cyanide bottles, whose contents complete the work so well begun. The two Cyanide bottles are a great convenience in keeping apart the large and the small specimens, and these being kept constantly in an upright position, the danger of injury from rubbing is reduced nearly to a minimum. The two chloroform bottles are to be used alternately as occasion seems to require.

The collector will soon find that while many of the moths will bear a brilliant light, many others will start as soon as light enough is thrown upon them to make them fairly visible. He must therefore be exceedingly wary of starting these timid ones, even though his present quest be among those which bear the greater amount of light, for oftentimes the fluttering of two or three will start from the tree nearly every individual, and hundreds will be in the air on the shortest notice. I have never succeeded with ale, stale beer or rum, in so intoxicating any species of Catocala that it would bear light or noise without indicating dissatisfaction. This leads me to remark that one will invariably meet with the best success when he works alone. Conversation will surely start the moths from any enticements of sugar that can be devised. I have even been much annoyed by a cat which would persistently precede me from tree to tree, and in her anxiety to get food (for she devoured the moths greedily), would thus startle the very ones which I was particularly anxious to capture. On one occasion a chipmunk visited one of my trees and kept it completely cleared of the bait with which I had supplied it, becoming at

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length so indifferent to other surroundings that I had little difficulty in giving him a sound rap over the head with a hickory switch, which sent him some ten feet away, and though he scrambled hastily up a neighboring tree, I found him on my next round, a few minutes afterward, demurely licking my sugar again as though nothing had happened.

Notwithstanding the season just closed has been somewhat noticeable for the scarcity of Lepidoptera, a fact doubtless to a great extent due to the severity of the previous winter, the subjoined table will show that the material collectible at sugar is at least reasonably abundant. It will be seen that for the four weeks beginning on Aug. 17th, I was at my post five nights each week. Subsequent to that period other duties prevented my continuing the work regularly. It should be observed also that whereas I made a somewhat exhaustive examination of the trees from Aug. 17th to Sept. 11th inclusive, I after that time made no memorandum of the more common species which still continued to throng for their accustomed food. In connection with a few of the species enumerated no dates are designated, as my memoranda failed to indicate the precise time of their capture. Earlier in the season (June) I had taken at sugar *Thyreus Abbottii*, *Anisopteryx vernata*, *Catocala fratercula*, *C. ilia*, etc., etc., which, except the last named, did not occur after Sept. 17th. Where but a single date of capture appears, usually but a single specimen was taken. Of *Pachypolia atricornis*, however, several fresh specimens were taken Oct. 6th, and one or two on a subsequent date, indicating for this species a very late apparition. Of *Scoliopteryx libatrix*, also, several specimens were taken, and, though not taken, it was observed a night or two previous to Sept. 10th.

Agrotis Normaniana Gr., August 18, 24, 26, 27, 28, 31 ; September 2, 3, 4, 7, 8, 9, 10, 11.

" baja S. V., August 18, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" badinodis Gr., September 10, 15.

" c-nigrum Linn., August 17, 18, 19, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" bicarnea Guen., August 18, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

" herilis Gr., August 24, 25, 26, 27, 28, 31 ; September 1.

" tricosa Lintn., August 24, 25, 26, 27, 28, 31.

" subgothica Haw., August 18, 19, 20, 21, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.

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Agrotis tessellata Harr., August 18, 26, 27, 28, 31 ; September 1, 3, 4.
" clandestina Harr.
" alternata Gr., September 23.
" cupida Gr., September 15.
" saucia Hübn., August 17, 18, 24, 25, 26, 27, 28, 31 ; September 1, 3, 4, 7, 8, 9, 10, 11.
" velleripennis Gr., August 28.
" messoria Harr., August 17, 18, 19, 21, 25, 26, 27, 28, 31 ; September 1, 3, 4, 7, 8, 9, 10, 11, 23.
" suffusa S. V., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Eurois occulta Hübn., August 27.
" herbida W. V., August 25.
Mamestra subjuncta G. & R., August 17 ; September 10.
" laudabilis Guen., September 8.
Dianthoecia meditata Gr., August 18, 19, 20, 21.
Pachypolia atricornis Gr., October 6.
Hadena arctica Bois., August 17, 18, 19, 20, 24, 25, 26, 27, 28 ; September 11.
" devastator Brace., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" adjuncta Bois., August 28.
" sputator Gr., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 4, 7, 8, 9, 10, 11.
" modica Guen., August 24.
" renigera Steph., August 18, 19, 20, 24, 25, 26, 27, 28, 31 ; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Perigea xanthioides Guen.
Dipterygia pinastri Linn., August 17, 18, 19, 26, 27, 28, 31; September 1.
Hyppa xylinoides Guen., August 17, 18, 26, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
Prodenia commelinae Abb. & Sm., August 17, 19, 25, 28; September 1.
Helotropha reniformis Gr., August 18, 19, 21, 25; September 3, 4, 8, 22.
" atra Gr., September 10.
Hydroecia nictitans Linn., August 17, 26, 27.
" sera Gr. & R., August 18.
Gortyna immanis Guen., August 26; September 3, 4, 10, 11, 22, 23.
" rutila Guen., September 2, 3.
" nebris Guen., September 15.

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Platysenta atriciliata Gr., August 18.
Heliophila pallens Linn., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 4, 7, 8, 9, 10, 11.
" phragmitidicola Guen., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" Harveyi, Gr.
" renipuncta Haw., August 17, 18, 19, 20, 21, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" pseudargyria Guen.
Laphygma frugiperda Abb. & Sm., September 2.
Pyrophila pyramidoides Guen., August 17, 18, 19, 20, 24, 25.
Taeniocampa oviduca Guen.
Atethmia pampina Guen., September 23.
Orthosia inulta Gr., September 22, 23; October 2.
Xanthia ferruginoides Guen., September 3, 4, 10, 15, 22, 23, 29.
Scoliopteryx libatrix Linn., September 10.
Lithophane cinerea Riley, August 18, 26.
Calocampa nupera Lintn., September 23.
Crambodes talidiformis Guen.
Plusiodonta compressipalpis Guen., September 4.
Telesilla cinereola Guen., August 26, 27; September 1, 2, 3.
Lygranthoecia brevis Gr., September 10.
Pyrrhia exprimens Walk., August 28.
Eustrotia carneola Guen., August 17, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4.
" nigritula Guen.
Drasteria erichtea Cram., August 17, 18, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11.
" erichto Guen., September 11.
Catocala insolabilis Guen., September 2.
" unijuga Walk., September 7, 11, 15.
" Briseis Ed., September 11.
" parta Guen., September 2, 23; October 2, 3.
" concumbens Walk., August 17, 24, 25, 26, 27, 28, 31; September 1, 8, 10, 11, 23.
" amatrix, Hübn., August 31; September 1, 7, 11, 22, 23; October 2, 3.
" cara Gnen., August 17, 18, 31; September 2, 3, 7, 8, 9, 11, 15, 22, 23, 29; October 2, 3.

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Catocali ilia Cram., August 19; September 23.
" cerogama Guen., August 31.
" neogama Guen., August 31.
" piatrix Gr.
" habilis Gr., October 23.
" consors, Abb. & Sm., September 7.
Homoptera lunata Drury, August 18, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10, 11, 22, 23.
" Saundersii Beth., September 1, 2, 3, 4, 7, 8, 9, 10.
" edusa Drury, September 1, 2, 3, 4, 7, 8, 9, 10, 11, 22, 23.
Pseudaglossa lubricalis Geyer, August 17, 19, 24, 25, 26, 27, 28, 31; September 1, 2, 3, 4, 7, 8, 9, 10.
Epizeuxis americalis Guen., September 10.
Zanclognatha cruralis Guen., August 28.
Orthosia helva Gr., August 18, 21, 28; September 3, 4.
Homopyralis tactus Gr., August 28.
Camptogramma gemmata Hübn., September 2, 3.
Phaecariophora niveiguttata Gr.
Ochyria latirupta Walk., October 2.
Eupethecia miserulata Gr., September 23.
Asopia costalis, September 3.
Tortrix coruscana Clem., September 3.
Darapsa choerilus Walk., August 26.

ON CHOEPHORA AND ALLIED GENERA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The discovery of fresh specimens has induced me to modify my proposed fusion of the genera *Choephora* and *Pseudorthosia* (Bull. B. S. N. S., 3, p. 86). For the present I would arrange the species as follows:

♂ Antennæ bipectinate, setose; eyes naked; all the tibiæ spinose: abdomen cylindrical. . . Choephora *G. & R.* (Sp. 2: C. fungorum *G. & R.*, C. pectinata *Grote.*)

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♂ Antennæ brush-like; eyes naked, lashed; all the tibiæ spinose: abdomen cylindrical; habitus of *Orthosia*. . . Pseudorthosia *Grote* (Sp. 1: P. variabilis *Grote*).

Fore tarsi with prominent spines at the extremity of the joints; fore tibiæ not spinose, middle and hind tibiæ spinose; abdomen a little flattened; habitus of *Glaea*. . . Pseudoglaea *n. g.* (Sp. 2: P. blanda *Grote*, P. taedata *n. s*).

Pseudoglaea taedata n. s.

♀. The males are not known of this genus, which differs from the *Ammoconia* group of *Agrotis*, by the want of a mesial thoracic crest, unarmed fore tibiæ and the spines on the fore tarsi. *P. taedata* is of a faded olive fuscous, with a dusting of darker scales; hind wings and under surface tinged with ruddy. Stigmata darker than the wing, blackish; orbicular rounded; reniform upright, squarish. T. p. line black, even, nearly straight, slightly bent; s. t. line irregular. Hind wings with faint mesial line and spot, more visible beneath, where in the primaries the discal mark forms an annulus. *Expanse* 44 m. m. Texas (G. W. Belfrage, No. 584. Nov. 15).

In the specimen the t. a. line is not indicated. The large species would be taken for a *Glaea* at first sight. It is paler, more dusty colored than *P. blanda*, with larger stigmata. There is a faint terminal festooned line on the wings, beyond which the concolorous fringes are paler, a little yellowish, at their base.

MICRO-LEPIDOPTERA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

GRACILARIA.

G. negundella. N. sp.

Basal joints of fore legs ochreous red; femora and tibia dark brown, obscurely marked with white; tarsi white dusted and annulate with brown. Intermediate legs like the first pair, except that the basal joints are brown; hind legs and the under surface of the abdomen white dusted with dark brown, the tarsi tinged with yellowish and the upper surface of

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the abdomen brownish. Palpi dark brown, with whitish scales intermixed on the under surface; antennae with alternate annulations of white and dark brown; head, thorax and fore wings ochreous, dusted with white and with some small dark brown spots along the costal and dorsal margins (these spots are sometimes indistinct), and the apex sometimes sparsely dusted with dark brown scales; the triangle is *very faintly* indicated, being a little paler than the rest of the wing; ciliae pale grayish fuscous, with the apex and a "hinder marginal" line about the middle dark brown. *Al. ex.* 7 lines. The larvae were found in abundance at Drura, Colorado, in September (alt. 5,300 ft.) rolling downward from the tip of the leaves of the Box Alder *(Negundo)*. Though this tree is abundant in Kentucky, I have never met with any larvae of this genus feeding on it.

In the last number of the *Cincinnatti Quarterly Journal of Science* (Vol. 2, p. 289) I have published descriptions of other species of *Tineina* from Colorado, but that paper abounds in typographical errors, some of which it is necessary to correct to prevent confusion; and as that journal is no longer published, I avail myself of this opportunity to correct them. Such mistakes as "*Teneina*" instead of *Tineina* are palpable and scarcely need correction, but there are others that do. P. 290, for "*rosasuffusella*" read *roseosuffusella;* for "*Taygate*" read *Taygete.* P. 291, for "*gallæsotidaginis*" read *gallaesolidaginis.* P. 292, for "*cruciferuu*" read *cruciferarum.* P. 294, for "*gædastella*" read *gædartella*, and for "*sparsipulrella*" read *sparsipulvella.* P. 295 and elsewhere, for "*Phyllætis*" read *Phyllocnistis.* P. 300, for "*lespedegofoliella*" read *lespedezæfoliella.* P. 301, for "*puinrosella*" read *prunionella*, and p. 304, for "*Thuiva*" read *Theisoa.*

I take this opportunity also to correct a few errors of a similar character which, thanks to the P. D. or bad chirography, have crept into some recent numbers of the CAN. ENT. Ante p. 124, for "*bodicella*" read *badiella.* The position in which the names *Solenobia Walshella* Clem. and *Tinea auropulvella* Chamb. are placed on p. 125, *might* possibly convey the impression that they are considered as synonyms for the same species, but such was not my intention, as the insects are very distinct and have but little resemblance to each other. *Walshella* is *loc. cit.* only catalogued as found in Canada.

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NOTES ON ARCTIA AMERICANA.

BY H. H. LYMAN, MONTREAL, P. Q.

As I have reared the above named moth from the egg, I can add an interesting fact or two to the account of its preparatory stages, published by Mr. Bunker on p. 149, vol. vii, of this periodical.

From a batch of eggs laid about August 6th, I obtained a number of larvæ, eight or ten of which passed through their last moult but one on September 23rd, and one accomplished its last moult on October 5th, after which it rapidly increased in size, attaining its full growth in a day or two, and then spun itself up into a cocoon, which was kept in the house. The imago emerged on November 28th. All the others died during hybernation.

CORRESPONDENCE.

I am able to add the names of two more species of butterflies to Mr. Caulfield's "List of Diurnal Lepidoptera of the Island of Montreal," published on pages 86–90, of vol. vii, namely: *Lycæna violacea* Edw., very rare; I took one ♀ specimen on our mountain, on June 10th, 1874. *Amblyscirtes vialis* Edw., very rare; one example taken on our mountain on June 8th, 1875. I am indebted to Mr. Scudder for the determination of these species. There is one error in Mr. Caulfield's List which requires correction; the name *Euphyes metacomet* Harris should be substituted for *Hedone orono* Scudder, as the latter does not occur here as far as known.

H. H. LYMAN, Montreal, P. Q.

WEEVIL COCOONS.—W. H. G. writes in *Science Gossip*, No. 133, Jan'y 1, 1876, that he obtained the Weevil (*Cionus scrophulariæ*) from cocoons made by the larvæ on the Water Betony (*Scrophularia aquatica*).

WM. COUPER, Montreal, P. Q.

VANESSA MILBERTI.—This insect has lately come from its winter retirement in some numbers. The weather has been delightful.

W. L. MEAD, Ithaca, N. Y.

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Rec'd. April 18th 18

The Canadian Entomologist.

VOL. VIII. LONDON, ONT., FEBRUARY, 1876. No. 2

THE NORTH AMERICAN BLUE BUTTERFLIES OF THE GENUS NOMIADES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

Some years ago I proposed* the generic name Glaucopsyche for a group of blue butterflies of eastern N. America having a glaucous sheen to the upper surface of their wings; I had not then recognized its strictly generic alliance with a group of similar forms in Europe and on our Pacific slope, which do not all possess this peculiarity, and to which the older generic name Nomiades Hübn. must be applied. A recent study of their common structural features, however, shows that Glaucopsyche can no longer be retained. Finding that there has been some confusion, at least in the cabinet designations of the species of this group, a brief revision of the same, with comparative descriptions, is here offered.

The species belonging to this group, it may be remarked, all have but a single transverse series of spots upon the under surface of the hind wings (the extra-mesial row), the submarginal markings being wholly obsolete. In the six American species the upper surface of the wings of the male are always blue, more or less broadly and distinctly margined with dark brown, while the wings of the female have this surface dark brown, more or less amply suffused from the base outward with blue.

1. N. XERCES (*Lycaena Xerces* Boisd.) In this species the blue on the upper surface of the wings of the male is of a pale tender violet and the margin is neither so black nor so narrow as in the other species, and has a very faint extreme edge of black. The upper surface of the wings of the female is of a little paler brown than in the other species, has a decidedly white, untarnished fringe, and at the base scattered blue scales as in *N. Antiacis*, but extending further from the base; the black outer edge is more distinct than in the female of the other species. Beneath,

* Syst. Rev. Am. Butt., 33.

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the species is readily distinguished by its having all the spots large and white, with no black pupils; they are usually roundish subquadrate and those of the same series nearly coalesce to form a continuous band. California.

2. N. ANTIACIS (*Lycæna Antiacis* Boisd., *Lycæna Mertila* Edw.) The blue of the upper surface of the wings in the male of this species is much less pruinose than in the following two species, although it occasionally varies toward them in this respect; the normal color, however, is a deep violet and the black border of the wings is of the same depth of color and narrowness of extent as in those species. The upper surface of the female is almost entirely brown with a few scattered blue scales near the base of the wing running out toward the middle. Beneath, the wings closely resemble those of *N. Couperi*, but the sprinkling of hoary scales is nearly uniform over both wings. California.

Lyc. Mertila Edw. seems to me clearly referable to this species, since the only part of the description which does not fit it is the statement that, on the underside of the fore wings, "from the arc" (or transverse bar at the apex of the cell) "a whitish ray runs toward the base."

3. N. COUPERI (*Glaucopsyche Couperi* Grote; *Lycæna Pembina* Edw. [Syn., nec. Proc. Phil. Acad.]* *Lycæna Lygdamus* Doubl. [List Brit. Mus. nec Entom.]) This species closely resembles the following, with which it has often been confounded; the two, indeed, would perhaps be universally considered geographical races of a single species, were they known to meet anywhere on common ground. The upper surfaces of the wings of the males of the two species appear to agree altogether. The upper surface of the wings of the female of this species is brown, rather heavily suffused with cœrulean blue on the fore wings as far forward as the upper limits of the cell, and to an equal distance toward the outer border; on the hind wings, the blue scales are more generally diffused, but in much less abundance. Beneath, the spots are much smaller than in *N. Lygdamus*, sometimes reduced on the hind wing to the merest black specks encircled with white; and the ground color is obscured, especially on the hind wing, by a rather abundant powdering of grayish hoary scales. A

* A prolonged study of all the species of N. American blues leads me to the conclusion that the true *Lyc. Pembina* Edw. has been twice redescribed; under the names *L. Lycea* Edw. and *L. Rapahoe* Reak.

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northern Atlantic species, not yet found in the United States, but extending from Anticosti and Southern Labrador to Lake Winnipeg and the Saskatchewan.

4. N. LYGDAMUS (*Polyommatus Lygdamus* Doubl. Entom.) I have never seen the female of this species, but the wings of the male are pale glistening pruinose blue above, with a narrow, distinct, black border; beneath, the species is peculiar for the large size of the ocellated spots, the clearness of the dark slate brown ground color little obscured by any dusting. It is a Southern Atlantic species, ranging through the sea-board States of the Union from the valley of the upper Susquehanna to Georgia.

5. N. ORO, nov. sp. This species has been referred in collections to the preceding species, with which it is no doubt closely allied, but from which it differs in several particulars. The upper surface of the wings of the male is almost entirely destitute of the pruinose bloom of *N. Lygdamus* and is of a much more delicate, tenderer blue, which permits all the spots of the under surface to be seen upon the upper side, a peculiarity shared with it by the following species only; the dark border of the wings is also narrower than in *N. Lygdamus*, but equally well defined though not so dark; the grayish white fringe of the hind wings is not in the least interrupted by blackish at the nervure tips, as it always is in *N. Lygdamus*. The upper surface of the wings of the female is mostly of the same blue as in the male, through which the spots of the under surface of at least the hind wings may be seen; the apical fifth or sixth of the fore wings is brown, generally merging gradually into the blue and never sharply defined from it; so the anterior portion of the hind wings is of the same brown as far as the subcostal nervure and its middle band, and a narrow line of brown follows the hind border; the apex of the cell is marked by a very narrow, sub-obsolete, transverse blackish bar. Beneath, the wings closely resemble those of the Californian *N. Antiacis*, but the extra mesial series of spots on the hind wings is more uniform, the distance between the second and third spots (from the costal border) being less than usual in this genus. I have only seen this species from Colorado.

6. N. BEHRII (*Lycæna Behrii* Edw.; *Lycæna Polyphemus* Boisd.) The upper surface of the wings of the male is of a blue, scarcely differing from that of *N. Oro*, but is not quite so delicate and is slightly darker, with all the veins slightly hoary and so more than usually distinct,

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the base of the costal border is also distinctly marked with whitish scales; the dark bordering of the wings is narrower than in any of the other American species of Nomiades, narrowing on the fore wings from in front backward so as to be a mere line below the middle of the wing, and being but a mere line throughout the entire outer border of the hind wing; the tips of the nervules are narrowly blackish; the fringe is blackish at base, whitish beyond, most narrowly interrupted with blackish at the tips of the nervules of the hind wings. The upper surface of the wings of the female, an inspection of which I owe to the kindness of Mr. Mead, resembles that of *N. Couperi*, but the hind wings are more suffused with blue. Beneath, the ground color of the wing is paler than in our other species, being of a delicate pale French gray, slightly darker in the female than in the male; and it differs from the other species also in the contrast between the size of the spots on the fore and hind wings, though a similar but not so striking a disparity may sometimes be seen in *N. Couperi;* on the fore wing these spots, with their rather narrow white borders, occupy each an interspace's width, though the transverse bar at the tip of the cell is reduced nearly to a line; on the hind wings the bar at the tip of the cell would scarcely be noticed but for its white bordering, and the spots are of uniform size, the black pupils reduced to little more than dots with a pale bordering as broad as that of the spots on the fore wings. The only specimens I have seen come from the southern part of California; probably the species does not occur in the middle and northern parts of the State.

It appears highly probable that the species here described is the true *Lyc. Behrii* Edw., though not the species (*L. Maricopa* Reak.*) labelled *L. Behrii* in collections, from the later determinations of Mr. Edwards. It may also be considered the *Lyc. Polyphemus* of Boisduval, a name which Mr. Edwards has placed as synonymous with the *L. Behrii* of his later determinations, *i. e.*, *L. Maricopa*. In the specimens above described, however, the two upper spots of the extra mesial series of ocelli on the hind wing (to which it would seem that Boisduval referred) are not coalesced, devoid of ocelli, and their separation indicated by a dusky nervule. Boisduval's expression is "on voit à la place des deux petits points discoidaux, une tache blanche cordiforme coupée transversalement par une petite ligne noire à peine sensible." He also speaks of the female as brown, without reference to the basal suffusion of the wings with blue.

* This species has sub-marginal markings on the wings.

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DESCRIPTIONS AND NOTES ON CERTAIN MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Among several interesting species of Noctuæ, which recent collections in the vicinity of Buffalo, N. Y., have brought to light, is a species of *Gortyna* Hübn. (*Hydroecia* Led.) allied to *G. nitela* Guen. I have already called attention to the fact that the single European species of *Ochria* Hübn., to which Lederer would restrict the term *Gortyna* (as I believe incorrectly), is distinguished by a clypeal projection, easily perceived if a slender pin is passed along the front, without denuding the head of the insect. The Californian *Ochria Sanzalitæ* is also furnished with a clypeal horn; but the Eastern species are without it, and are all referable to the genus *Gortyna*. Many of the species of this genus are infrequently met with, as a rule; and, even in Europe, seem to be among the rarities. This is perhaps owing to their habits; the larvæ being internal feeders in the stems (*Gortyna* in part) or roots (*Apamea* Ochs. *Hydroecia* Guen.) of plants. Mr. Norman has bred *Gortyna cataphracta* Grote from thistle stems. This latter species has a curious resemblance to the European *Ochria flavago*, but differs generically by the want of the clypeal horn.

Gortyna necopina, n. s.

♂ ♀. Of the same blackish olivaceous with *G. nitela* and *Stibadium spumosum* Grote, with paler hind wings. Everywhere there is an even sprinkling of white scales. These can be seen on the body parts and secondaries, as well as most prominently on the dark anterior wings. No markings on these latter whatever. All lines and spots obsolete. Only the reniform indicated by a deeper color. *The costal white ante-apical dots* are obsolete or extremely minute. Beneath both wings pale, like hind wings above, everywhere pulverulent with white. The legs and under body parts are everywhere powdered with white. This character is here not very conspicuous and becomes unnoticeable when the insect is rubbed, as is the case with my male example. It may be made out, however. The median space of primaries is more sparsely frosted. *Expanse*, ♀, 43 mil.; *length of body*, 24 mil. *Expanse*, ♂, 34 mil.; *length of body*, 17 mil. Collected by Mr. Fischer.

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Differs from *nitela* by its less purely olivaceous color, the absence of the t. p. line and inconspicuous costal dots. The thoracic tuft behind the collar is prominent.

Lygranthoecia Meskeana Grote.

I learn that this species has been re-described under the name *Heliothis fastidiosa* Strecker.

Xylomiges hiemalis Grote.

I learn that this is the "*Dryobota Californica* Behr. MS.," too briefly described in Mr. Strecker's work for identification, and later than the above name in appearing. The eyes are hairy, not naked, as they should be were the insect a *Dryobota*.

Galgula subpartita Guen.

This species I have collected not uncommonly in Central Alabama. Mr. Belfrage has sent it from Texas, and Mr. Lintner from New York. It has also been sent from California by Mr. Hy. Edwards and Mr. James Behrens. From Illinois Mr. Thos. E. Bean has forwarded me a specimen authentically determined as "*Telesilla vesca* Morrison." This latter name is a synonym; the species of *Galgula* being also generically distinguishable from *Telesilla*.

Hadena quaesita, n. s.

This is closely allied to *lignicolor*, but a darker colored species. The ornamentation is similar, the stigmata more distinct, the reniform smaller. The median lines are faint, and seem to occupy similar positions with those in *lignicolor*, but here the t. p. line is more flexuous, being a little bent between veins 2 and 3. The hind wings are blackish fuscous, paler at base, with faint median line, reflected discal spot and light yellowish fringes. Beneath darker than in *lignicolor*. In the new species the color is more blackish brown; over the terminal space the color is, as usual, deeper, relieving strongly the pale W-mark. On a close comparison, the t. a. line is seen to be less strongly produced on submedian fold than in *lignicolor;* the reniform is narrower superiorly, smaller, and less constricted. Else the species might be considered at first sight as a very dark *lignicolor*, with the markings distinctly apparent. The orbicular is pale and reduced. *Expanse* 45 mil. Racine, Wisc., Mr. O. Meske.

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Stiria rugifrons Grote.

This species is found to have been unintentionally omitted from the "Check List."

Tarache patruelis Grote. (743 of "Check List.")

A small species taken by myself in Alabama, and sent from Bastrop Co., Texas, by Mr. Meske. Referred here provisionally. Scaly. Fore wings triangulate, shaded ochreous and pale. The ordinary lines very pale and narrow. The most prominent ornamentation an oblique stripe (median shade?) running inwardly from costal angulation of t. p. line to middle of hind margin, and joining an apical streak so that it appears to issue from apex. The stripe is whitish, bordered inwardly with deep ochreous. Outside of it the narrow t. p. line runs divergingly to internal margin. Hind wings pale yellowish white, stained along external margin. The Texan specimen is smaller, more yellowish and paler than my type from Demopolis, which expands 16 mil.

The second part of my Check List of Noctuidæ is delayed by my not having as yet sufficient material in the Deltoids, and I venture to call the attention of my correspondents generally to this fact and to urge the collection of this group the present season. I shall be glad to receive collections of Deltoids from any quarter and will determine and return specimens promptly.

Hypenula, n. g.

The moth possesses characters which ally it to *Renia* and *Hypena*. The ♂ antennæ are setose and provided with two longer bristles on each joint. The ♀ antennæ are similar, but the bristles are shorter. The palpi are free, very long, curbed, with elongate second joint, and extend upwardly above the head; they are flattened, rather shortly scaled and seem to be slightly longer in the male. Eyes naked, tibiæ unarmed, vestiture of allied genera. The wings are more elongate than in *Hypena*, much like *Renia*, with full rounded secondaries not exceeded by the abdomen.

Hypenula opacalis, n. s.

♂ ♀. Entirely dusky blackish fuscous. Median lines fine, black, denticulate, single. T. a. line outwardly curved. Reniform with two superposed white dots (sometimes obsolete), small, yellowish or dis-

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colorous. Orbicular small, discolorous, near the t. a. line. Subterminal line pale, denticulate, continued on hind wings. Terminal sub-continuous black line similar on both wings; fringes dusky. Hind wings blackish fuscous, but little paler than primaries, with a median black shade line. Beneath paler with double rivulous lines, the outer pale shaded; a discal streak on hind wings. *Expanse* 22 to 30 mil. Texas, in May (Belfrage, Nos. 185, 195, 196). Varies in distinctness of the pale shading to the subterminal lines, and by the t. a. line being in one specimen edged inwardly with whitish scales. There appears to be in fresh specimens a very sparse frosting of white scales over the fore wings.

Melanomma auricinctaria Grote.

I have received from Mr. E. L. Graef the second specimen I have yet seen of this little moth. I find that it has ocelli. Notwithstanding its rounded wings, pectinate antennæ, and gray, geometridous ornamentation, it must be referred to the Pyralidæ. It is possibly allied to the Brazilian genus *Cryptocosma* of Lederer; the shape of the wings is, however, quite different. The species can be easily recognized by the black cellular spot, which beneath shows a yellow iris, and by the subterminal line of gilded scales. The tapering smooth abdomen and elongate palpi assist us in referring the moth to the Pyralidæ, while the neuration has not been examined. It appears to be of rare occurrence in New York and Pennsylvania.

Euproserpinus phaeton G. & R.

Dr. Boisduval (Suites a Buffon, 1874, 363) says as to the species which he calls *Macroglossa phaeton*, quoting Grote and Robinson's original description, that he does not know by what chance we changed the name of this species from *crato* to *phaeton*. This remark is based on a misunderstanding. We first described this species as *Euproserpinus phaeton* in our Synonymical Catalogue, Nov., 1865. It had not been previously described. A colored drawing was shown us by Mr. S. Calverley (who had had it engraved with the name), with the information that the insect had received the name of *Proserpinus phaeton* Boisduval in manuscript. We preserved Dr. Boisduval's name, giving him in our paper credit for the species. Afterwards, in 1867, we had a specimen kindly loaned to us by Dr. Boisduval, *two years later*. On this specimen we gave a re-description of the species (under the same name) in September, 1868, Trans. Am. Ent. Soc., giving our views on the structure of

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the genus. At about the same time Dr. Boisduval published the species under the name *erato*. This was the first known to us of any other name for the insect. In his last work Dr. Boisduval disavows the authorship of *phaeton*, but adopts the name for the species on our authority. I come to the conclusion that the name "*phaeton*" was transferred from some other species by Dr. Boisduval's Californian correspondent, or that the name "*phaeton*" was originally proposed by some other naturalist, perhaps Dr. Behr or Lorquin.

Oncocnemis Saundersiana, n. s.

Fore tibiæ with a terminal claw. Allied to *Oncocnemis occata* from Texas and California. Differing as follows: Head and thorax black. Median space darker than basal and terminal spaces, which latter are washed with white. Median lines twice further apart inferiorly than in *occata*. Median lines *even*, not scalloped. Median shade black, not very diffuse. Ordinary spots larger; orbicular with an evident dark centre. The dentations of the s. t. line connected, followed by a vivid white line. Fringes wholly black, not checkered as in *occata*. Hind wings much as in *occata;* a terminal vague broad blackish band, within which is seen the median line; fringes white. Beneath less brown than in *occata*. *Expanse* 28 mil. Grimsby (Mr. Pettit). Two specimens.

This is a very handsome, distinctly marked species, easily recognized by the above contrast with its ally. Named for Mr. Wm. Saunders, of London, Ont.

Hadena illata.

Agrotis insignata || Walk., C. B. M., 353.
Agrotis illata Walk. ibid, 742.

From a specimen in the D'Urban Collection, in the cabinet of the Ent. Society of Ontario, determined as "*Agrotis illata*" by Mr. Walker. I find that the insect is a common *Hadena* which I had not hitherto identified with certainty. Whether this name can be sustained for the species I am doubtful, Mr. Walker's description being vague and even contradictory, except as to color.

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TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

POLYHYMNO.

Instead of "extreme tip hooked backwards," as in the generic diagnosis, it would be better to say extreme tip curved outwards.

P. fuscostrigella. N. sp.

On page 247 of volume six, I have described a species as *P. luteostrigella*, which is scarcely an appropriate name, as the streaks are golden rather than luteous. The markings in this species are identical with those of *luteostrigella*, except that the streaks are fuscous instead of golden, though each of them becomes yellow before the apex. In the description of *luteostrigella* it is stated that the streak within the dorsal margin and the inferior branch of the median meet in the apical part of the wing, and then immediately separate and meet again at the apex; perhaps it would be more accurate to say that they cross each other instead of meet and separate, and in some specimens they simply meet and pass around the dorsal margin to the apex together (being margined along the base of the ciliae with yellow); in such cases the space between the two branches of the median streak is streaked with fuscous, which seems to be a continuation of the intro-dorsal streak which has become confluent with or interrupted by the dorsal branch of the median. In both species the third and fourth costal streaks are very oblique, the third pointing backwards and the fourth forwards and converging to the same point, and behind the fourth are two short oblique dark brown streaks pointing backwards to the extreme apex. The account of these streaks in the description of *luteostrigella* is slightly inaccurate and represents one more streak than actually exists. The above account is correct for both species. All of the streaks are confluent before the apex, and all become yellow at or before their confluence, and the caudate tip is yellow, becoming brown at the apex; beneath the caudate tip and opposite to the fourth costal streak is a black dot (not mentioned in the description of *luteostrigella*), and there are in this species two other minute and indistinct ones before it in the base of the ciliae, which at this part

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(beneath the caudate tip) have a metallic lustre. *Al. ex.* ½ inch. This species is so similar in the position of its markings to *luteostrigella*, that it may prove to be the same species, but its greater size and fuscous instead of golden markings induce me to consider them as distinct. Texas; Belfrage.

GRACILARIA.

G. rhoifoliella. N. sp.

Face and palpi white, with the apex of each joint of both pairs of the palpi, and some scattered scales along the under surface brown. Anterior and middle tarsi white, with the joints faintly tipped with brown; tibiae of the hinder pair whitish beneath, and with white spurs tipped with brown; tarsi white. Thorax and primaries brown with a yellowish tinge, but becoming darker brown towards the apex and on the costa near the base, and with bright purplish reflections in some lights; along the extreme costa and sometimes on the fold is a series of dark brown dots; trigonal mark absent; ciliae fuscous; venter white, dusted with dark brown. *Al. ex.* ½ inch.

My first specimens came to the light at the Bee Spring Camp of the Kentucky Geological Survey, near Mammoth Cave, but a few weeks later I bred it in Northern Kentucky from larvae mining the leaves both of the "Poison Oak" *(Rhus toxicodendron)* and the Sumach *(Rhus copalina.)* It mines either side of the leaf, and the mine, at first linear, is at some part of it widened and excavated like the tentiform mine of some species of *Lithocolletis;* sometimes the tentiform mine is not connected with the linear mine. After it has ceased feeding in the mine, it rolls the leaf rather clumsily downward from the tip.

G. inornatella. N. sp.

Palpi white stained with ochreous yellow towards the tip of the second joint, and with an ochreous yellow annulus before the tip of the third; head and antennae white, the antennae annulate with pale yellowish ochreous. Thorax and fore wings white, suffused with pale reddish ochreous, the basal part beneath the fold more whitish; and there is an oblique white fascia before the middle nearest the base on the costal margin. In some lights the wings show a purple gloss. The hind legs are missing in the single specimen before me; the anterior and middle pair are of the general hue on their anterior surfaces and white behind,

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and the tarsi are whitish, with pale reddish ochreous annulations at the joints. Perhaps the general hue is more accurately designated pale yellowish or brick red, than reddish or yellowish ochreous, and this hue is as, or more, distinct on the under than on the upper surface of the fore wings. *Al. ex.* a little more than ½ inch. Kentucky in May.

G. Sauzalitœella. N. sp.

Face pale sordid yellowish; vertex whitish mixed with reddish ochreous or rust red; antennae fuscous, in some lights tinged with red and faintly annulate with whitish; palpi, fore wings and thorax rust red, or perhaps as properly reddish brown, appearing in some lights deep reddish orange; the palpi a little sprinkled with white, and the dorsal margin of the fore wings from the base to the ciliae darker, almost fuscous; extreme costa white, with a row of minute brown dots along its entire length and extending around the apex, and a similar line of dots marks the more reddish anterior part of the wing from the darker dorsal portion, and the wing becomes darker towards the apex. The general color resembles that of *G. stigmatella* Fab. and *purpuriella* Chamb., but is darker, more lustreless, and there is no trigonal mark. The under surface of the thorax and the anterior surface of the legs are of the general hue, the tarsi being a little paler and annulate with white. Under surface of the abdomen sordid whitish dusted with brownish red. *Al. ex.* nearly seven lines. The neuration is that of *stigmatella* as figured *Ins. Brit., v. 3.* Sauzalito, California; from Mr. James Behrens.

G. Behrensella. N. sp.

Orange yellow; the palpi a little brownish; the vertex a little pale and the antennae sordid yellowish white with fuscous annulations. There is a small spot on each side of the thorax before the tip, and on the fore wings there is an oblique white streak near the base from the dorsal margin to the fold; behind this is a rather narrow oblique fascia, nearest the base on the dorsal margin, and thence to the tip the wing is much mottled with small white spots, especially along the costal margin, and the yellow color becomes paler towards the tip. Under the lens the white spots appear to anastomose, forming a series of more or less interrupted white streaks, nine or ten in number, perpendicular to the margin and some of them crossing the wing. The apical part of the wing is sparingly dusted with brownish scales, as also are the ciliae, which are pale orange or stramineous. *Al. ex.* ½ inch. California; from Mr. Behrens.

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G. basquella. N. sp.

Very near *G. (Parcetopa) robiniella* Clem., but still quite distinct. Head and thorax white with an indistinct narrow brown line from the anterior margin of the thorax to the apex; palpi pale grayish or grayish white; antennae brown; legs brown, the tarsi annulate with white; abdomen brown; anal tuft whitish. Fore wings brown, the apical half dwsted with white, the dusting becoming more dense towards the apex; there are three costal white streaks, the first near or a little behind the basal fourth; the second is a little larger, and just beyond the middle both of these are oblique and the second is a little curved; the third before the ciliae is smaller and perpendicular to the margin. There is a basal streak just within the dorsal margin, and which extends to the basal fourth of the wing length; a little beyond this and opposite the point of the first costal streak is a rather large obliquely curved white dorsal streak; the second dorsal streak is opposite the end of the second costal and the third dorsal is small, perpendicular to the margin and opposite to the third costal, *from which it is separated by a straight brown fascia*, which appears very distinct in the dusted portion of the wing. Ciliae white with a wide dark brown hinder marginal line extending around their base and another beyond the middle, and a short brown "hook" at their apex. *Al. ex.* $\frac{5}{8}$ inch. Collected by Mr. Belfrage in Bosque Co., Texas.

G. sassafrasella. N. sp.

Ochreous yellow; the head and long slender palpi inclining to brownish; the outer surface of the third joint brown except at base and tip, and the fore wings with a purplish gloss; antennae longer than the wings, brownish, faintly annulate with pale ochreous. Fore wings with small black dots chiefly along the margins; three of these are conspicuous, one not far from the base, one near the middle and one near the apex on the costal margin, and opposite the space between the first and second is another on the dorsal margin, and the extreme apex is suffused or dusted with brown. Two (or three?) dark brown hinder marginal lines in the ciliae. The wings are very narrow. Hind wings and upper surface of the abdomen dark slate color. The dorsal portion of the fore wings shows the purple hue much more strongly than the costal. First and second pair of legs brown with white tarsi, which are faintly annulate with purple at the joints; third pair of legs a little paler, with ochreous tarsi and base of femora white. Under surface of abdomen and anal tuft ochreous. *Al. ex.* not quite $\frac{1}{2}$ inch.

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For many years I have searched the leaves of the *Sassafras officinale* for "Micro" larvæ, but have never found a trace of one until this summer (June, 1875), when the larva of this species made its appearance in great numbers. It is an ordinary white *Gracilaria* larva, which makes a linear crooked mine, ending in an oblong tentiform mine along the midrib on the under side of the leaf. When about half grown, the larva leaves the mine and rolls the leaves (chiefly the very young ones) downwards into a clumsy imitation of a cone. It pupates in a yellow cocoon on a leaf.

LYONETIA.

L. gracilella. N. sp.

Snowy white with a silvery tinge. Antennae dark brown above, becoming deeper towards the apex, and paler below; palpi white, *stained externally with fuscous;* fore legs with the anterior surface of the tibiae and tarsi fuscous, and the joints of the tarsi of the middle and hind legs annulate with fuscous; upper surface of the abdomen *pale* silvery fuscous. Hind wings and under surface of the fore wings brown, with short yellowish white lines along the course of the fold on the under surface of the fore wings; ciliae of the hind wings and dorsal ciliae of the fore wings *nearly to the tip brown, with strong purple reflections;* behind the middle of the wing length, along the middle of the wing, is a short brown streak, in some lights golden brown, which presents an obtuse angle towards the costa, and the point of which intersects in the middle a brown or golden brown streak or narrow fascia, which crosses the wing at the beginning of the ciliae, is a little concave towards the base, *and is extended along the extreme costa to the base of the wing, and on the dorsal margin encloses a small white spot;* behind this fascia *is an orange yellow patch which extends to the rather large* circular velvety black apical spot; behind the fascia are three short blackish costal streaks in the ciliae, perpendicular to the costal margin, and equally distant from each other; *opposite the last of these, and separated from it by the point of the orange patch, is a rather long and narrow dorsal* black streak also perpendicular to the margin, and between this streak and *the fascia is a short broad fuscous hinder marginal line at the base of the dorsal ciliæ.* Costal and apical ciliae silvery white, and *behind the apical spot is a transverse fuscous line across the middle of the ciliae, which sends back through the tip a short and rather indistinct fuscous "hook."* *Al. ex.* a little over ⅓ inch. Kentucky in June.

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It is quite distinct from *apici-strigella* Cham., and seems to be between *clerkella* and *padifoliella* as described in *Ins. Brit., v. 3.* The italics show the points in which it seems to differ from *clerkella*, which is nearer to it perhaps than *padifoliella.*

NEW CALIFORNIAN AND TEXAN MOTHS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

Arsilonche album, n. s.

An easily described species. It differs from *A. absidum* Harvey, which is received in several examples under the number 2734, from Oregon, by being totally white. Expanse 34 m. m. No. 5993, Oregon, Mr. Hy. Edwards' coll.

The synonymy of the several species of this genus is as follows :

1. *Arsilonche albovenosa* Goeze Btr., 3-3 251 (1781.)
Simyra venosa Bkh. iv, p. 716. 1792.
Leucania Henrici Grote, Bul. Buf. Soc. N. S., vol. 1, p. 10 (1873).
Leucania evanida Grote, Bul. Buf. Soc. N. S., vol. 1, p. 10 (1873).
Ablepharon Henrici Grote, Bul. Buf. Soc. N. S., vol. 1, p. 112 (1874).
Ablepharon evanida Grote, Bul. Buf. Soc. N. S., vol. 1, p. 112 (1874).
Ablepharon fumosum Morr., Bul. Buf. Soc. N. S., vol. 1, p. 275 (1874).

This synonymy is given by Mr. Morrison after Dr. Staudinger has identified the American *Henrici* as the same with the European *albovenosa.*

2. *Arsilonche absidum* Harvey.

Ablepharon absidum Harvey, Bul. Buf. Soc. N. S., vol. 2, p. 275 (1875).

This species is lemon yellow, with the t. p. line continued on the secondaries, variably indicated by dark dots. It is very distinct.

Arsilonche album Harvey.

Faspidea viridata n. s.

Fore wings light green, with distinct black lines. Orbicular with a black annulus and central spot. Beneath this is the large claviform, black

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margined and with a black dot; these two form a combination like the figure of eight. Cell black powdered between the spots. Reniform large, with green centre, edged with white and with a black annulus, irregular, medially strangulated. Above it the t. p. line seems to join its outer margin, but in reality is obsoletely produced beyond it, appearing below it dentate to internal margin. Terminal space light green; s. t. line obsolete opposite the cell, below black, dentate. Fringes checkered with black. Hind wings white, with lunule distinct beneath and double exterior shade lines and distinct black edging. Thorax scaly; green with black spots on tegulæ.

Expanse 30 m. m. No. 5605, San Diego, Cal., Mr. Edwards.

Agrotis æqualis n. s.

♀. Allied to *Wilsoni* and especially resembling some of the varieties of that species, but distinguishable by the subterminal line not being twice more prominently indented, but pale, dentate throughout its length, and by the concolorous terminal space and larger stigmata. Hoary olivaceous fuscous with a tinge of brown; claviform indicated; orbicular large, irregularly elongate; reniform wide; the cell shaded with brown; t. p. line geminate, regularly lunulate. Fringes brown, discolorous. Hind wings fuscous, deepening in tint outwardly, with pale, faintly interlined fringes and long narrow discal streak; beneath whitish, irrorate on costal region, with faint terminal shade and discal mark; primaries fuscous. Thorax and head concolorous with fore wings.

Expanse 38 m. m. California. No. 101, Mr. Hy. Edwards' Coll.

Agrotis satis, n. s.

♀. A small species resembling *æqualis* in coloration; fore wings more deeply tinged with red brown. A sub-basal brown streak; median lines geminate, denticulate; t. a. line perpendicular; t. p. line rounded opposite cell and there denticulate. Some black dots before the s. t. line; terminally the wing shows a deeper shade; the paler fringes broadly interlined. Hind wings fuscous, without marks, with pale interlined fringes. Beneath fuscous with common line determinate on veins and discal dots; that on primaries contiguous to the line. Collar with a marginal brown line; head and thorax concolorous with wings.

Expanse 28 m. m. No. 3486, California, Mr. Hy. Edwards' Coll.

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Agrotis choris, n. s.

♂. Hind wings pellucid white, a little stained; veins marked. Fore wings uniform dull gray; veins obsoletely marked. T. a. line geminate, denticulate, fine, black. Orbicular black ringed, small, rather elongate. Reniform narrow, curved; claviform obsoletely indicated. T. p. line obsolete, marked on the veins. S. t. line faint, near the margin; terminal line black, interrupted; fringes concolorous. Antennae brush-like; head and thorax like fore wings; palpi darker at the sides.

Expanse 36 m. m. Nevada, No. 2626, Coll. Mr. Hy. Edwards.

Agrotis Sierræ, n. s.

♀. Allied to *haruspica;* differs by the paler secondaries and more slender habit. Body and fore wings uniformly fuscous; lines black illegible. Both stigmata present; orbicular rounded; reniform elongate lunate. Hind wings beneath with discal mark and shade line; above immaculate, pale, pellucid, fuscous. Abdomen as dark as thorax.

Expanse 45 m. m. No. 2623, Sierra Nevada, Cal.; Mr. Hy. Edwards Coll. I regret that I have not been able to compare this form with the European *augur*.

Agrotis recula, n. s.

♀. The smallest species of the group of *4-dentata* and *cicatricosa*. Hind wings white, soiled with fuscous. Fore wings nearly black, with a yellowish stripe from the base outwardly below costa to above the prominent yellow stigmata. Orbicular spherical; reniform of the usual shape, rather broad, approximate to the dotted t. p. line. A splash of yellowish below median vein to the s. t. line, which is black dotted, followed by yellow with two yellow teeth to veins 3 and 4. Beneath whitish with the spots reflected on primaries.

Two specimens. Oregon, No. 5969, Mr. Hy. Edwards' Coll.

Agrotis pyrophiloides, n. s.

A species with slender body and wide wings, and looking like a *Pyrophila*, but with spinose hind tibiae. Greasy; fuscous and dirty ochre, with wavy blackish lines. Orbicular of the ochreous ground color, concolorous, rounded; median shade blackish, heavy; reniform concolorous; t. p. line geminate, with pale included space, denticulate. Costal dots distinct on the blackish subterminal space. A terminal festooned ochreous line, cutting the black line at base of fringes. In one

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specimen the ornamentation is obliterate. Body concolorous; hind wings fuscous, paler at base. Beneath paler with common line and discal marks, that on primaries elongate and near the line.

Expanse 38 m. m. No. 5662, California; No. 5624 var., Mr. Hy. Edwards' Coll.

(To be Continued.)

ADDENDA TO LISTS OF DIURNAL LEPIDOPTERA, SPHINGIDÆ AND ZYGAENIDÆ OCCURRING ON THE ISLAND OF MONTREAL, P. Q.

BY F. B. CAULFIELD, MONTREAL, P. Q.

RHOPALOCERA.

Colias philodice Godart, var. *laurentina* Scudd.

In the end of July, 1874, I took a *Colias* on Montreal Mountain, which appeared to me to be different to anything I had hitherto seen. I sent it a short time since to Mr. Scudder, who kindly determined it for me as a Gynandromorphic ♀ of his var. *laurentina* of *philodice*. A second example, also a ♀, was taken by Mr. Pearson the same season.

Thecla agustus Kirby.

One specimen taken by Mr. Kollmar, May 24th, 1875.

Lycæna neglecta Edw.

I took a ♂ of this species June 26th, 1875. It was in beautiful condition, evidently fresh from chrysalis, and is the only example I have seen from this locality.

Euphyes metacomet Harris.

The *Hedone orono* of my List, CAN. ENT., vol. vii, p. 89, must be referred to this species. I received both these species from Mr. Herman Strecker, of Reading, Pa., along with some other material, accompanied by a list giving the names. Unfortunately, when referring the examples to the list I mistook the numbers, and gave *orono* instead of *metacomet*

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I have, however, taken *orono* here, as Mr. Strecker wrote me that there was a specimen of it in a box of Lepidoptera that I sent to him in 1872. It is very rare, as I have not met with it since.

HETEROCERA.

SPHINGIDÆ.

Lethia gordius Cram.

One example; Mr. Pearson.

ZYGAENIDÆ.

Alypia Maculiochii Kirby.

Two examples; Mr. Knetzing.

CORREPSONDENCE.

DEAR SIR,—

In the October No. I find an account of Mr. Dimmock's method of denuding the wings of Lepidoptera. From the account given, it seems to me that it will take as much time, though perhaps less trouble, than the old way of denuding them with a moistened brush. It may, however, answer for butterflies and the larger moths, but for Tineidæ, Tortricidæ, Pyralidæ, and the smaller moths generally, the plan of which I have given an account in a previous volume of this magazine seems to me preferable. It is as follows: Take a piece of glass about one inch by three in size (say a glass "slide" of a microscope), place the wing on it, in from one to three or four drops of strong solution of potash, according to the size of the wing; cover with one of the thin pieces of covering glass of microscopists (do not use enough fluid to float the cover glass); hold, with a clothes pin or other small forceps, the large glass over a lamp chimney until it begins to boil, removing it at the first sign of ebulition, when the wing will be found denuded if it is a fresh and small specimen; if large, or old and dry, a little longer boiling may be necessary. The fluid may then be drained off by tilting the glass a little, and all traces of the potash removed by adding a few drops of water; and the cover glass being removed, the wing may be mounted on the same glass or floated on to another, or it may be at once accurately sketched by the microscope and

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camera lucida. The whole process of mounting may be accomplished in a minute or little more, or it may be mounted and sketched in five minutes or less. In this way I have mounted and sketched hundreds of wings of Tineidæ, which I hope some day to publish in the pages of the CAN. ENT. V. T. CHAMBERS.

Colorado Springs, Colorado, Feb., 1876.

ENTOMOLOGICAL NOTES.

DEAR SIR,—

Ceratomia quadricornis.—I have during the past season, and for the first time in my life, taken a number of the larvæ of *Ceratomia quadricornis* Harr., of a brown color. Out of five taken in one locality, four were of a deep brown. The fifth was of the usual green hue. These larvæ were about half grown when captured. This was early in September, but since then I have taken several other specimens, the majority of which were brown. I should like to learn whether any of your readers have, at any time, made similar captures.

Doryphora 10-lineata.—A safe and effective method of destroying this beetle is to drag an ordinary butterfly net over the haulm when the larvæ and beetles are feeding. By this method, and without making any particular effort, I captured on Long Island, this year, over five hundred specimens in about as many minutes. By making a sort of drag net, large enough to be worked by two boys, a much larger number could of course be captured in a given time. I have no doubt that Long Island will be plentifully supplied with *10-lineata* next year; for, although thousands were drowned and washed up on the beach at Coney Island and elsewhere, the number that escaped must have been great. But, although admitting the desirability of ridding ourselves of this pest, I by no means admit that it is the scourge talked about by some Entomologists. As I intimated before, we had plenty of them on this Island, but no one complains of a small crop of potatoes in consequence.

W. V. ANDREWS.

36 Bœrum Place, Brooklyn.

ERRATA.—On page 16, line 7 from top, for *Heliophila renipuncta* read *H. unipuncta*.

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The Canadian Entomologist.

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NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part I.

BY W. H. EDWARDS, COALBURGH, W. VA.

My attention having recently been drawn to the "Historical Sketch of the Generic Names Proposed for Butterflies, a Contribution to Systematic Nomenclature, by S. H. Scudder, Salem, 1875," in which some hundreds of names have for the first time been advanced, I was led to investigate for myself the sources whence part of them were derived, especially the works of Hübner. And the conclusion to which I have come respecting many of these newly proclaimed genera being directly the reverse of that of the author of the Sketch, I desire to state the case for the consideration of the readers of the ENTOMOLOGIST, who may naturally be supposed to feel an interest in whatever concerns any branch of Entomological nomenclature.

1. I have before me what purports to be a fac-simile of Hübner's Tentamen, "reprinted by Samuel H. Scudder, Cambridge, U. S. A., 1873." It comprises a single leaf, without date, the printed matter measuring 7 x 9 inches, and covering both sides of the leaf; and is entitled Tentamen determinationis digestionis atque denominationis singularum stirpium Lepidopterorum, peritis ad inspiciendum et dijudicandum communicatum, a Jacopo Hübner. An Attempt at Classification of the several groups of the Lepidoptera, communicated to skilled persons to be examined and pronounced upon.

In this Attempt, the Lepidoptera of all orders are divided into Phalanxes, Tribes, and a farther division not named, but which, from the analogous arrangement in the Verzeichniss bekannter Schmetterlinge, are Stirps; and so far as relates to the Butterflies, the classification is as follows:

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Phalanx I. PAPILIONES.

Tribus I. Nymphales.

I. Nereïdes—Nereïs Polymnia.
II. Limnades—Limnas Chrysippus.
III. Lemoniades—Lemonias Maturna.
IV. Dryades—Dryas Paphia.
V. Hamadryades—Hamadryas Io.
VI. Najades—Najas Populi.
VII. Potamides—Potamis Iris.
VIII. Oreades—Oreas Proserpina.

Tribus II. Gentiles.

I. Rustici—Rusticus Argus.
II. Principes—Princeps Machaon.
III. Mancipia—Mancipium Brassicae.
IV. Consules—Consul Fabius.
V. Urbani—Urbanus Malvae.

At the end of the paper we read: Ne expectet quis, ordinem hanc nullam amplius correctionem esse desideratum. Let no one suppose that this arrangement will require no farther correction. Hübner did his own printing and this leaf was for his own use and for certain of his learned friends to examine and give him their opinions upon. He gives the following account of the origin of the Tentamen in the Preface to the Verzeichniss bek. Schmett.: "Though many systematic works upon the Lepidoptera have already appeared, yet none exists wherein all the known species are properly classified. This circumstance compelled me, ten years ago, when I began to extend my works from European to exotic species, to *sketch for myself a systematic Catalogue* of those various species, in order to be able to begin my contemplated Sammlung Exot. Schmetterlinge. *This Sketch I immediately printed under the title Tentamen, &c., in order that it might be examined and judged of by competent persons before I adopted it.*"

In Silbermann's Revue Ent. 1833, T. 1, p. 101, is given by M. Geyer, who was assistant to Hübner in his publishing from 1818 to 1833, and who continued the works of Hübner after the death of that author, a list of Hübner's works, as follows:

1. Geschickte Europ. Schmetterlinge.
2. Sammlung Europ. "
3. Sammlung Exot. "

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4. Zutraege zur Sam'l. Exot. Schmett.
5. Verzeichniss bekannter Schmetterlinge.
6. Systemat. Alph. Verzeichniss zur Samml. Europ. Schmett.

Of these, No. 3, begun 1806, was continued to 1833 by Geyer.

Vol. 1, 413 pl., title, Index, and 12 pages text.

Vol. 2, 225 pl., title, Index.

Vol. 3, 21 pl.

Of No. 4, begun 1818, continued to 1833, were published Vols. 1, 2, 3 and 34 pl. of iv., but without text. No mention is made in Geyer's list of the Tentamen.

In Thon's Entom. Archiv., Jena, July, 1827, Vol. 1, p. 28—30, Geyer has given a biographical sketch of Hübner, in which he states that Hübner was first a designer in a cotton factory near the Moldavian frontier; was entirely self-taught, but studied the Lepidoptera diligently. That Geyer became acquainted with him and worked with him from 1818 onward, and he continues thus: "but as in the beginning Hübner felt the necessity of a natural system to be able to give accurately the limits of all groups of the Lepidoptera, he printed a *provisional sketch* after the principles of Linné, Fabricius and Schiffermueller, *on a quarto sheet, which later was enlarged and published with the title Verzeichniss bekanter Schmetterlinge*, 1816, 8vo. *What he believed erroneous in this work* (Verzeichniss) *he tried to amend in his Lepid. Zutraege*," published 1820. Geyer then gives a list of Hübner's works, same as that given in the Rev. Ent. before cited, and makes no mention therein of the Tentamen. Mr. Scudder, Hist. Sketch, p. 98, speaking of the Tentamen, says: "It is also included by Geyer in his list of Hübner's works." What Geyer says we have seen. The Tentamen is included in neither of his lists of Hübner's works, but apart from the list, in Thon's Archiv., a "provisional sketch," not even specified as the Tentamen, is stated to have been made, which later *was published as the Verzeichniss.* The very word used by both Geyer and Hübner—a sketch—implies incompleteness, and means a rough draft, an outline, and cannot possibly be construed to mean a "work," which is a completed structure, and in this case a completed book. Dr. Hagen calls my attention to the fact that Geyer's words, as well as Hübner's own in the Preface to the Verz., (er machte bekannt.) to-day mean *published*, but that formerly they were applied to any printed slip, *and as used by Hübner and Geyer are equivalent to "printed,"* as I have translated them. The difference between printing and publishing I need not dilate upon.

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Such, then, is the history of this now celebrated sheet, printed in 1806 by Hübner as a Sketch, or rough draft, for his own use and for the examination of some learned persons, expressly stated by him to have been subject to their approval *before even he himself would embrace it*, never known to have been approved by any one, never claimed to have been more than a "provisional sketch" or draft of the book which in 1816 was published as the Verzeichniss, and which differs materially from the draft, as would any completed and published book or paper from the original draft of same, discovered by Mr. Scudder seventy years after it was printed and nearly as many after it had been forgotten, and proclaimed by him as an authority in nomenclature, not only over the Verzeichniss, which is its other self, but over all works of Hübner, and all works of all authors since 1806, superseding—wiping out as with a sponge—the labors of three generations of Entomologists. And plainly, if this little Sketch can claim of right such prodigious distinction, the nomenclature of every department of Natural Science is at the mercy of any leaf or printed slip which may hereafter be discovered in the attics or the junk-shops of the civilized world. It becomes us therefore to scrutinize this sheet closely.

Mr. Scudder relies upon the mention of the Tentamen in the Verzeichniss, and upon a reference to what is understood to be the Tentamen in the preface to the Lepid. Zutraege, but in which the name or the title does not appear; also to a reference by Ochsenheimer, and later by Dr. Hagen in the Bibliotheca Entomologica, 1862, as evidence that it was known to Entomologists for years as an existing work, *and by implication that it was recognized as a work having authority.*

Hübner's own references, whether direct or indirect, proved nothing, and as to that in the Biblioth. Ent., Dr. Hagen informs me that when he mentioned the Tentamen in that work, he had never seen it, and knew it only from Ochsenheimer's mention, and now that he has seen it, he is explicit in his rejection of it as having either authority or value.

Ochsenheimer, Schmett. Eur. iv, 1816, says: "Hübner has under the title Tentamen, &c., published on a quarto sheet a sketch of a system of Lepidoptera, in which to the divisions adopted by him are given generic names of unequal value. Hubner seems to be aware of this himself, for he says in concluding, 'let no one suppose that this arrangement will require no farther correction.' *This sheet I saw only long after the printing of my 3rd Vol. was done.*" This was then after 1816, as

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Ochsenheimer's 3rd Vol. bears date that year. Mr. Scudder has inadvertently copied this as 1st Vol., 1807, instead of 3rd Vol., 1816. So as Dr. Hagen, in a note, says, "the Tentamen was not known to the chief Lepidopterologist of his day for ten years or more after it was printed, though he was in intimate communication with Hubner, and that he did not know it shows clearly that Hubner did not think it of importance enough to be communicated to him."

Herrich-Schaeffer, in different Regensburg pamphlets, 1857–1869, states that he has bought all the plates, books and scientific material belonging to Hubner, and will continue Hubner's works. He gives a list of them, with dates of their original publication, and includes the Verzeichniss bek. Schmett., and the Syst. Alph. Verz. (which is another catalogue), but says not a word of the Tentamen, the best proof that he did not regard it as a scientific publication.

Dr. A. Speyer, Ent. Zeit. Stett., 1875, Vol. 36, p. 98, thus expresses himself: "Grote swears by the priority principle and has vigorously carried out the same, not only in regard to species, but to genera and higher divisions. He has laid hold of a yet older catalogue of Hubner's than the Verzeichniss in the Tentamen, &c. *I have never met with the Tentamen, which, according to Ochsenheimer, contains a plan of a system of Lepidoptera, on a quarto sheet, and neither I presume have most of my readers. I have therefore been obliged to pass no judgment on the right of those generic names to supersede later ones chosen by Hübner himself or by others.*"

"The Tentamen is not recorded in the large yearly Index of all German publications," as I am informed by Dr. Hagen, "published at Leipzig, which Index is regarded as the most correct existing." And the same distinguished Entomologist also assures me that he himself "has most of the catalogues of the libraries belonging to prominent Entomologists, and which have been offered for sale during the past forty years, *and the Tentamen is not mentioned in one of them*, not even in those of Zincken-Sommer, Charpentier and others who were contemporaries of Hubner and were prominent and accomplished Lepidopterologists. These men and Ochsenheimer and Germar were the '*peritis*' of their time and there is no evidence that one of them had seen it; and," adds Dr. Hagen, "*a work in nobody's hands, printed for private purposes, cannot be considered as a scientific publication.*"

So that this sheet, so far as appears, was known to German authors,

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who of all the world might have been supposed likely to have been familiar with it if it ever had been published or had any scientific value, only by the mention of it in the Verzeichniss, of which it was the original sketch, or from the mention in Ochsenheimer, who says he did not know of it till after 1816, that is, till after the Verzeichniss was published, and through the mention in the preface of that work he probably got his first information about the Tentamen.

And it is worthy of notice that from 1806 to the present day, *scarcely one of the German lepidopterists have recognized any of Hübner's works as authoritative in nomenclature.* This movement in favor of Hubner originated in England with a small number of authors, and quite lately has been extended to the United States by the efforts of Messrs. Scudder and Grote.

In the year 1842, the British Association appointed a Committee composed of the most eminent zoologists of the day, to draw up and report a code of Rules "by which the nomenclature of zoology may be established on a uniform and permanent basis." The committee submitted to the Association a series of propositions that same year, 1842, which were adopted. In 1845, a Committee appointed by the Association of American Geologists and Naturalists, adopted the rules of the British Ass'n with slight alteration.

Rule 12 reads as follows: "*A name which has never been clearly defined in some published work should be changed for the earliest name by which the object shall have been so defined.*" And in the explanatory text accompanying, the Committee of the Br. Ass'n say: "Two things are necessary before a zoological term can acquire any authority—*definition* and *publication. Definition properly implies a distinct exposition of essential characters, and in all cases we conceive this to be indispensable. To constitute publication nothing short of the mention of the above particulars in a printed book is sufficient to authenticate a genus. . . . . Nor can any unpublished description, however exact, claim any right of priority till published, and then only from the date of publication.*" In a printed book! Not on a stray slip nor on a loose sheet, nor in the columns of a newspaper, but in a book, that its permanence may be assured and that it may be known of by all men.

Geyer says that Hubner published his provisional sketch in an enlarged form as the Verzeichniss; and Hubner says "let no one suppose that this arrangement will need no farther correction." And accordingly we

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see that Hubner does not use the names of the 13 secondary divisions of the Papiliones of the Tentamen at all in the Verzeichniss. The species *Polymnia*, for instance, stands in the former as "*Nereis Polymnia*;" in the latter it is *Mechanitis Polymnia; Potamis Iris* is changed to *Apatura Iris*, and so on through the entire list. And only a part of the Stirps of the Tentamen are retained in the Verzeichniss, five of them, namely, all the Gentiles, being changed for others, as *Principes* to *Archontes*, &c. Moreover, one Stirpsin addition is given to each Tribe.

Yet the author of the Sketch, in disregard of Rule 12, has given the names of these 13 secondary divisions of the Tentamen as so many names of genera, crediting them to Hub., 1806. Thus *Nereis* Hub., 1806; *Consul* Hub., &c., adding to each the species accompanying it in the Tentamen, with the words "sole species and therefore type." These names have never been used, and several were dropped by Hubner himself, but the systematist of to-day must *reinstate* them, as he terms it, as if they had ever had one moment's standing, and claims for them an honest priority over the labors of other men. And not only has Mr. Scudder given a set of names based upon these divisions of the Tentamen, *but a complete set of other names for the equivalent divisions of the Verzeichniss.* Thus Hubner, as I have said, changed all the Stirps of the Gentiles, *Principes* into *Archontes*, *Rustici* into *Astyci*, &c., and we have in the Hist. Sketch a genus *Princeps* and a genus *Archontes*, a *Rusticus* and an *Astycus*, each pair in Hubner standing for precisely the same thing. But apparently to escape the appearance of their duplication, the last set are attributed to "Franck's Catalogue," a production much subsequent to the Verzeichniss and of which I will speak presently.

But to return to the Tentamen. In the Hist. Sketch we read "*Potamis* Hub. Tent., 1806; *Iris* sole species and therefore type. This name never since used must be restored." "See *Apatura*." Turning over the leaves we find "*Apatura* Fab." and three species ranged under it, *Iris*, *Bolina* and *Alimena*, and read: "in 1806 Hubner (Tent.) selected *Iris as type of Potamis. Consequently Apatura must be restricted to the other two, which are congeneric, and Bolina may be taken as the type. This, however, is not in accordance with subsequent usage* (from 1806), *as will be seen by the following*," &c. And then are given a dozen authors, including Hubner himself in the Verzeichniss, nearly every one of whom has employed *Iris* as the type of *Apatura*. And Mr. Scudder adds with amusing naiveté, "this result is from want of familiarity with Hubner's Tentamen!"

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Beyond a question, the Tentamen, though historically interesting, or as a curious fossil, has not the least value as an authority for nomenclature, and these 13 genera set up by Mr. Scudder must come down.

The other Phalanxes of the Tentamen, and which cover about 80 per cent. of that sheet, relate to the Heterocera, and I shall not say more of them at present than that they one and all are subject to the same fatal objection with the Papiliones; and any system of arrangement based upon these divisions is worthless.

2. In the year 1825, a certain collection of Lepidoptera owned by the late M. Franck was offered for sale by his widow, and Hubner was employed to draw up a sale catalogue, a copy of which, from the Mus. Comp. Zool. Camb., I have examined. It is entitled "Catalogue de feu M. Franck, cette collection est en vente chez Mme. Ve. Franck, a Strasbourg." Near the end is a classified list of all the species embraced in it, divided according to the Stirps of the Verzeichniss, merely the names and the habitat being given, as *Archon Polydamas* L. Brazil, *Astycus Proteus* L. Surinam. *Now these names are not generic names in this Catalogue unless the Stirps names in the Verzeichniss are also generic names.* They, as well as the Stirps names, are given to what modern systematists call a Family or sometimes a Sub-Family. For example, *Andropodum* in this Catalogue embraces 44 species, including all the modern genera of the Family or Sub-Family Pieridæ, as *Pieris*, *Anthocharis*, *Colias*, *Terias*, *Callidryas*, *Gonepteryx*; and it is identical with the Stirps *Andropodum* of the Verzeichniss. Under *Archon*, which is equivalent to Papilionidæ, stand *Papilio*, *Leptalis*, *Thais*, *Parnassius*, and so on. It is plain, therefore, that these names are in no sense names of genera. And yet Mr. Scudder has set up several of them as names of genera, being, as I have mentioned before, all those which Hubner substituted in the Verzeichniss for the names of the Tentamen. But instead of taking them directly from the Verzeichniss, he seems to have adopted a round-about method. On page 93 Hist. Sketch, he says: "Only those names" (of genera) "are introduced which are connected with the binomial nomenclature founded by Linné; for this reason the trinomials of Hubner" (such as *Oreas nubila Norina*, *Andropodum fugax Palaeno*, etc., astonishing appellations used in the iconographic works of Hubner) "and other writers have been totally disregarded. *All or nearly all the trinomials of Hübner are actually used by him in some work or other, in the Tentamen or Franck's Catalogue, with a binomial application, and in those cases they are here introduced, but only dating from the time at which*

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and for the species for which they were employed binomially." Now, here is *Andropodum* in Franck's Catalogue, precisely the equivalent of *Mancipium* of the Tentamen (which latter is already set up as a genus in the Sketch and stamped Hüb., 1806), and is substituted for it in the Verzeichniss, employed to cover 44 species belonging to many genera. Mr. Scudder pounces at random on one of these, which happens to be *Ilaire*, and stands it up as type of the new-old genus *Andropodum* Hüb., 1825, not taking the trouble to first pull down *Mancipium*. I have not examined the Zutraege, and for aught I know there may be a third equivalent of *Mancipium* found there, which also is one of these genera. Geyer says that what Hübner thought erroneous in the Verzeichniss he tried to amend in the Zutraege, and he may not unreasonably have seen fit to amend his Stirps' names the second time. Certainly, had he done so, we should have triplicate genus names in the Hist. Sketch. For some reason not stated, Mr. Scudder has attributed the name *Archon* type *Machaon* to the Syst. Alph. Verz. 1825, instead of to Franck's Catalogue, 1825, where its compeers are found, in disregard of his own statement before quoted as to the use of the trinomials—for in the Syst. Alph. Verz. the species *Machaon* stands as *Archon heroicus Machaon*.

Of course Franck's sale Catalogue, as regards authority in nomenclature, does not differ from Deyrolle's (Paris) sale Catalogue, or that of any other professional dealer in insects. I have a catalogue of a dealer in flower seeds, from Ipswich, England, in which all the names are arranged under the latest approved botanical system, and accompanying each is a brief indication of the habit, color and nature of the plant. This catalogue would scarcely be allowed by Dr. Gray to have authority in botanical nomenclature, and yet it has as much claim to that dignity as this Franck Catalogue, and in fact more, as it gives some sort of description of each plant mentioned.

We may infer, then, that zoologists have not merely to rummage for drafts and printed slips, but for sale catalogues as well, before they can reach the right basis of their nomenclature!

In the Historical Sketch are about 40 other genera attributed to Hübner on such authority as Syst. Alph. Verz., Index, Sammlung, exclusive of a host based upon the coitus of the Verzeichniss bekannter Schmetterlinge, and these one and all will be found to bear examination no better than the so-called genera from the Tentamen and Franck's Catalogue. They all lack the essential qualities of genera, being taken

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from works in which they stand as bare names, undefined and undescribed.

3. In the Preface to the Historical Sketch we naturally look for a statement of the plan upon which the author has worked, and the principles on which he relies for the correct exposition of generic names. And we read that he adopts in general—not the rules of the British Association—but those principles regarding genera enunciated by Agassiz, and more recently by Dr. Thorell in his work on European Spiders, "*with such exceptions and modifications as are indicated in my Canons of Systematic Nomenclature*" (published in Am. Jl. Sci. and Arts, May, 1872). Agassiz not being at hand, I turn to Thorell as quoted by Wallace, Anniv. Address, p. 10, and read: 1. "*There must be definition and description and publication. A recognizable figure of a species is sufficient, but of a genus there must be a description pointing out the generic characters.*" And Thorell adds: "*A new genus that has been distinguished merely by referring to some particular species of an older genus as its type, without in any way indicating which of the* CHARACTERISTICS OF THE SPECIES IS TO BE CONSIDERED AS THE MARK OF THE NEW GENUS, NO ONE CAN BE LOOKED UPON AS BOUND TO ACKNOWLEDGE. Nevertheless, it appears to me advisable to do so if the species referred to deviate in any generally known way from the typical species of the old genus, and always if the new genus has been once received and acknowledged." With the proposition laid down in the first part of this clause I fully agree, and it is in accord with the Rule of the Br. Ass'n. The last part is advisory, and taken with the other, means that while Dr. Thorell would concede a standing to genera already adopted and in use, he would require definition and description and publication in future, and would permit no genus to be based on a mere reference to a type, except in one extraordinary case, that of a well known variation from the typical species of the old genus. This advisory clause expresses an individual opinion and is propounded for the consideration of naturalists. But were it a law, it would afford scanty support to these new Hübnerian genera. There is no evidence that in any one of those taken from the Tentamen or from Franck's Catalogue, etc., the typical species designated by the author of the Hist. Sketch differs in any generally known manner from the remaining species of the old genus, and certainly these genera have not been received and acknowledged.

And what are the "exceptions and modifications" indicated in Mr. Scudder's Canons? Canon 3 reads: "The mere enumeration of its

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members when known is a sufficient definition of the limits of a group and gives it an unquestionable right to recognition." That looks rather like a reversal of Dr. Thorell's Rule than a modification of it, and it is the foundation on which these late innovations rest. What right has any man to lay down a Rule or propound a Canon at variance with the received Code, and then assume that his Rule or Canon has the force of law? The Rules of the British Association were adopted by the representatives of the different branches of zoology, assembled in convention, and they have been accepted and acted upon. If any of them need modification or repeal, such change must proceed from as high an authority as that which enacted them. We may reverence or respect the opinions of an Agassiz, or a Thorell, or a Scudder, but in these matters to consider opinions as so many laws would be to establish a dangerous precedent, and cannot for one moment be tolerated.

Under another of these Canons Mr. Scudder has undertaken to apply the rule of priority to groups higher than genera, as follows: "In any subsequent alteration of the limits of a group its name must never be cancelled." And accordingly we are requested to introduce a host of barbarous family and stirps names, to the utter confusion of the received nomenclature of the higher groups. The Committee of the Br. Ass'n, on the contrary, not intending to apply the rule of priority to these groups, recommended "that the assemblages of genera termed families should be uniformly named by adding the termination *idæ* to the earliest known or most typically characterized genus in them, and that the subdivisions termed sub-families should be similarly constructed with the termination *inæ*." And this recommendation has been accepted and generally acted on because this mode of designating families and subfamilies, being uniform and an aid to memory, was found eminently convenient. It was regarded as a vast improvement on the fantastic and heterogenous names of the earlier authors and of Hübner especially. But the effect of this Canon would be to swamp our nomenclature with such terms as armati and hypati, argonautae and moderatæ, adoleocentes and terribiles, frugalia and voracia, and hundreds more equally absurd. And already we find the writings of Mr. Scudder defaced and obscured by them. This is making progress backwards, and in my opinion is as sensible as if we were to surrender the Indian numerals for the letters of Rome, or the notation of chemistry for the hieroglyphics of the alchemist, or railroads for buck-boards and pillions.

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And although this Canon purports to relate only to groups higher than genera, the same reasons which would favor such an application cover genera also. And accordingly we find of late several entomological systematists wholly ignoring the Rule which requires definition of genera, and in the most reckless fashion indicating genera by the mere mention of types.

Of the 1,104 generic names in the Hist. Sketch, 283 are taken from the Verzeichniss bekannter Schmetterlinge, a work of which I propose to speak in a subsequent paper, and 57 are taken from the Tentamen and other works of Hübner, making a total of 340, or about 30 per cent. Scarcely one of all these can stand without displacing a name applied, with requisite definition and publication, by Doubleday, Boisduval, Westwood and other eminent authors, and the aggregate represents a vast sum of injustice.

NEW CALIFORNIAN AND TEXAN MOTHS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

(Concluded from February No., Page 38.)

Hadena Dunbari, n. s.

Eyes naked, tibiae unarmed, tufting of body obsolete, so that it approaches *oligia*, but is stouter than those species. Fore wings light gray, basal line black, distinct; t. a. line geminate, black outwardly and white inwardly, irregular; t. p. line geminate, produced above the reniform, curved outward, joining the reniform inferiorly. Median shade black, distinct. Orbicular round, white, with black annulus, with a dark centre; reniform subquadrate, black margined, having a carneous centre; claviform outwardly well expressed, concolorous, with a black border; s. t. line white, dentate, preceded by a black streak, obsolete opposite the reniform; an apical black streak. White dots on the costa in the s. t. space. Terminal line black, fringes concolorous and finely cut with white. Beneath cinereous; light outer border with terminal line well marked. Median shade quite evident on costa; alternate white and black costal marks. Hind wings smoky white, veins soiled, fringes

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white. Beneath concolorous, a discal lunule, with median and terminal lines obvious. Body concolorous; collar with a black line; black line at base of thorax; beneath, thorax and legs of a lilac shade. Abdomen whitish brown.

Vancouver Island, No. 5582, Coll. Mr. Hy. Edwards. Named for Dr. George W. Dunbar, of Buffalo, a zealous collector.

Hadena chlorostigma, n. s.

Eyes naked. Thorax blackish brown, tufted, edged with black; collar brown; sides and dorsal surface of body tufted. Primaries black, tinged with green; basal half line greenish; t. a. and t. p. lines narrow, black, geminate, accompanied by pure white shadings. In the character of the median lines this species resembles *chalcedonia* and *versicolor*. Median shade noticeable, blackish. Orbicular spot round, concolorous, ringed with black; reniform subquadrate, green, moderate, bordered with black; claviform minute, black. Beneath blackish, pale, irrorate; straight median line; discal spot on the line; subterminal fuscous shade; white spots on the costa, near the apex. Secondaries smoky, black, beneath median line denticulate, followed by subterminal fuscous shade; fringes short, paler.

Expanse 22 m. m. May 22nd, No. 544, violet label; G. W. Belfrage, Texas.

Perigea niveirena, n. s.

This species is of a mottled fuscous with distinct black, single waved transverse lines; the small reniform outwardly white margined. Subterminal line white, dentate, preceded by a blackish shade. Hind wings fuscous, paler beneath, with even common shade line and discal spot. Body concolorous.

Expanse 30 m. m. Vancouver Island, No. 5621; California, No. 5199, Coll. Mr. Hy. Edwards.

Gortyna obliqua, n. s.

♂. Resembles the Eastern *G. nitela*, but the pale t. p. line is more oblique, angulated immediately on costa. The color is more reddish brown. T. a. line outwardly angulate on median vein, thence downwardly straightly to internal margin, thus narrowing the median space inferiorly. Stigmata visible, paler than the wing, rounded. Subterminal

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line a light shade line, twice angulate, nearly opposite the cell and on inferior border. Subterminal space lighter than the stigmata. Hind wings pale, beneath with faint dot and line.

Expanse 36 m. m. No. 4410, California, Coll. Mr. Hy. Edwards.

This is the first Californian species congeneric with the Eastern species referred by Gueneé and Grote to *Gortyna*. The clypeal spine of *Ochria* is absent.

Caradrina flavimaculata, n. s.

♂. Wings elongate; primaries narrow, secondaries wide. Fore wings pale, fuscous with perpendicular, waved, darker transverse lines. Orbicular yellowish, small, rounded; reniform concolorous, small, with internal streak. A terminal series of black dots, preceded by a waved pale line. Hind wings pellucid white, with a terminal linear shade, soiled on the veins.

Expanse 30 m. m. Oregon, No. 6003; California, No. 3481. Coll. Mr. Hy. Edwards.

Graphiphora pulchella, n. s.

♀. Eyes hairy; head sunken; thorax untufted. Purple brown; terminal space lilac gray; costa shaded with lilac gray. Transverse lines dark, evident, denticulate; t. p. line geminate, forming a prominent series of points followed by gray dots; both lines followed by gray shades. Stigmata concolorous, edged with black and gray; orbicular sub-quadrate; reniform sub-equal, elongate, oval, slightly constricted at centre. Thorax purple brown. Hind wings and abdomen fuscous; beneath the wings are pale with a red flush, common lines and discal dots.

Expanse 33 m. m. No. 2921, California, Mr. Hy. Edwards' Coll. The handsomest species of the genus known to me.

Calymnia calami, n. s.

Antennae brown, palpi whitish, smaller winged and more slender than *orina*. Differs from it in the light yellow of the primaries. The median lines are trapezoidal, more nearly approaching each other at the inferior border, white with a dark shade internally. Reniform white margined, slight constriction externally. Orbicular round, small, with a white annulus; terminal line inconspicuous; fringes concolorous. Beneath of an ochreous shade, much like *orina*. T. p. line evident. Secondaries white, tinged with yellow, lines obsolete. Thorax and body concolorous

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with primaries above ; legs of the color of the under surface of primaries.

Expanse 30 m. m. Violet label, Mr. G. W. Belfrage, Bosque Co., Texas.

Lithophane Oregonensis, n. s.

Allied to *Georgii*, but paler gray, with the orbicular slightly extended below median vein, in which respect it resembles *laticinerea*. Whitish gray ; a fine basal black line. The geminate, acutely dentate median lines apparent on costa. Reniform with red central shade, black ringed, incomplete ; cruciform black marks before the subterminal line apparent. Median shade noticeable on costa. Head and thorax whitish gray ; black lines on the outside of the tegulae. Hind wings fuscous, with lunule. Body fuscous, with a red tinge. Thorax and legs gray beneath. Front and collar with a black line. Beneath light fuscous, with a light red stain and very distinct lunule on hind wings.

Expanse 45 m. m. Oregon, No. 5600, Coll. Mr. Hy. Edwards.

Lithophane carbonaria, n. s.

♀. A species with naked eyes, flattened abdomen and with untufted thorax, with the sides angulated, but very different in color from any known species, looking distantly like *Macronoctua onusta*. Primaries dull black shading into brownish toward internal margin. Lines geminate, apparent as darker shades. Orbicular spherical, concolorous ; reniform medially constricted, showing some powdery pale scales lining the annulus and centrally. Subterminal line preceded by black dots superiorly, pale ; fringes brownish. Hind wings smoky fuscous ; beneath paler, irrorate, with discal lunule. Fore wings beneath showing costal white dots. Head, thorax and legs blackish.

Expanse 36 m. m. No. 4417, Mr. Edwards' Coll.; California.

Thalpochares elegantula, n. s.

White. Primaries slightly yellowish, with a median brown line edging inwardly a brown fascia with a purple shade, and which encloses the round black edged reniform mark. Traces of the t. p. line beyond this may be made out. Apices and fringe touched with brown. Hind wings and body white ; beneath the fore wings are smoky.

Expanse 18 m. m. No. 2579, Nevada, Mr. Hy. Edwards' Coll.

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I hardly think December in Buffalo has ever been known to produce moths, yet I have to record the capture, on the 21st of December last, of a specimen of *Orgyia leucostigma*, by Miss Mary Walker, probably the contents of a late fall chrysalid, urged to escape by the unusual warm weather of the season.

ON GENERA AND THE LAW OF PRIORITY.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The writers who are engaged in the work of giving us an account of the different kinds of Butterflies and Moths inhabiting North America, seem to fall into two categories with respect to their ideas of classification. As in other departments of Natural Science, the Entomologists differ principally in their conception of what constitutes a genus. They are either *lumpers*, making their genera very wide, or *splitters*, making their genera restricted and dependent upon less conspicuous details of structure. And the different writers display as many phases of the two ideas, so that, with respect to any one individual, we may not certainly classify him without attention. Feeble *lumpers* may be recognized by their admittance of a few more obvious genera even when these have been proposed by representative *splitters*. Feeble *splitters* may be known by their admission of sub-genera, or sub-generic divisions. Again, the *lumpers* may be divided into *intelligent lumpers*, who, for the most part, may be aware of the minutest differences in structure offered by the objects of their studies, but who fail to consider these differences as worthy of expression in generic nomenclature; and *unintelligent lumpers*, who fail in perception and in knowledge alike. Numerically speaking, the *lumpers* are in the ascendant, perhaps in the proportion that it is easier to appreciate general resemblances rather than minute agreements. As the rule, it is the *lumpers* who attack, but, strange to say, it is not so much the method of the *splitters* that they attack by a display of argument drawn from fact, but the application of zoological rules of nomenclature and the operation of the law of priority in scientific writing. As a rule,

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the *splitters* have here the advantage from their more extended reading. With them it was a greater necessity that their more numerous genera should be correctly named, and they have been at pains to adopt from older writers, like Hübner, all the generic names they could legitimately use under the received zoological rules of the British Association. A want of comprehension of these rules which seems almost deliberate, has induced Mr. Strecker to attack the term *Cressonia*, now in use for *juglandis*, one of our Phalaenoid Sphinges, under the plea that it is synonymous with *Polyptichus*, whereas it was *originally* shown that *juglandis* was included with *all* the eyeless Phalaenoid Sphinges known to Hübner, and that, when it was found to differ from *all* of these, a different term was properly proposed for it, leaving *Polyptichus* to be used for one or more of the species included under it in the Verzeichniss. This by way of illustration.

With regard to the attack on the law of priority, or rather, its application by the *splitters*, this much seems reasonable, that, if its application defeats the end of Entomology, which is to give us exact knowledge of our insects, it must be modified or abandoned. To write merely to vindicate an application of any code of rules at the risk of confusing the study for the furtherance of which such rules have their excuse for existing, cannot be defended. If the law of priority cannot be extended so as to include Hübner, without endangering the study of Entomology, it would be advisable to drop Hübner.

The real contest does not seem to us to be about Hübner, although Hübner and his generic names and ideas have afforded the most popular, if not the most vulnerable point of attack to the *lumpers*. It is rather between the sets of ideas which we have described with regard to the value of genera. To illustrate: The N. Am. Phalaenoid Sphinges have been divided among the genera *Smerinthus*, *Paonias*, *Calasymbolus*, *Amorpha* and *Cressonia*. Objections are made against the use of Hübner's terms as here applied. Would it be any advantage to have ignored these and substituted new or different ones? Obviously, not. These terms are then as good as any others, provided they are to stand at all. And now let us look without impatience at these genera. What is the question which at this time is *the* question among naturalists. Is it not rather the question of how all these different species and genera came about, rather than a mere cataloguing of them for convenience sake? And will not, therefore, any system of classification which expresses more clearly the inter-relationship through slight modifications of structure, be the classifi-

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cation which thinking men will adopt? Now, in ignoring these slight modifications of structure in the case of the Phalaenoid Sphinges, we should have to lose sight of the fact that at least three of the American genera have no representatives in Europe, that the European *ocellatus* is represented in America by strictly congeneric species; both of these facts, which seem to us of great importance to know, would be obliterated by a lumping of the species indiscriminately under one generic name. In the case of one of these genera, *Cressonia*, it is known that it was incorrectly held by Dr. Clemens to represent the European *populi*, that the correction has been made, that its right to a separate consideration has been made plain. What is to be gained toward the solution of the great question of the development or origin of these species by overturning this work? Are we not able, indeed, to grapple with this question at a better advantage when we know all the facts in the case, than when our classifications are so deceptive as to embrace different kinds of structure under a common generic name? The mental operation by which we recognize "genera," is evidently the same kind as that by which we recognize "species." Both of these are alike abstract conceptions; they have the same basis for existing in our minds and books.

In so far as the new generic ideas seem a development of the old, and in consonance with our increase in knowledge, we may trust to them. It is well also that the *lumpers* have their say and full weight; for undoubtedly extreme cases of splitting have to be corrected, and extreme applications of the rules of priority have to be rejected as leading to no useful results to science, which should be the criteria for all scientific action. And with all these varying counsels we still can be reasonable with each other in our common cause; imputing no evil and overcoming each one his own unreasonableness so far as he is able. An adverse criticism from which there will be no appeal may fall on those of us who do not recognize the current scientific thought, but waste their opportunities in useless controversies, showing no appreciation of the scientific value of Entomology.

ENTOMOLOGY AT THE CENTENNIAL.—The Entomological Society of Ontario has forwarded a very fine collection of Canadian insects to Philadelphia, consisting of eighty-six cases, forty-five of which are Lepidoptera and twenty-seven Coleoptera, the remainder being occupied by the other orders.

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CORRESPONDENCE.

ENTOMOLOGICAL NOTES FROM THE COUNTY OF PETERBORO, ONT.

DEAR SIR,—

As no work, or but very little, can be carried on at this season out of doors, in aid of the objects you have in view in the publication of the CANADIAN ENTOMOLOGIST, I forward a few extracts from my note book of last year.

April 5th, 1875, I captured a fully developed specimen of that very troublesome butterfly, *Pieris rapæ*, in my garden, the thermometer having been only 1° above the freezing point on the preceding night, and not having risen beyond 38° during the entire day.

The *Pieris* was not nearly so destructive to my plants in 1875 as it was in the previous year, inasmuch as in the fall of that year I had discovered and destroyed some hundreds of chrysalids that had attached themselves to the inside of the doors and walls of my tool-houses, and beneath my verandah-roof. In 1874 my cauliflowers and cabbages, during my frequent absence from home, were well nigh eaten up by this garden pest, and such as were not actually devoured were rendered unfit for use by the quantity of excrement deposited between the leaves of the plants. A sprinkling of buckwheat flour was suggested as a remedy, but I tried it without effect.

May 16. The mischievous flying and hopping *Haltica striolata* was swarming in my melon-frames. I dusted the plants with soot, which appeared to disagree with their constitution and prevented their effecting any material damage. I have sometimes tried sprinkling the plants with tobacco water, which forces them to retire to the outside of the frame, where they can readily be destroyed before they recover from the effects of the tobacco.

May 24. The first Potato Beetle, *Doryphora decem-lineata*, made its appearance—not on my potato plants, for, since the advent of that interesting "bug," I have preferred purchasing to growing potatoes—but on my egg-plants and tomatoes, both of which plants belong (or rather *belonged*, for the tomato is now *Lycopersicum esculentum*) to the *Solanums*, as does the potato. I have generally found that where potatoes and egg-plants are grown in the same garden, the Colorado beetles attack the

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latter with even greater voracity than they do the former. My remedy, as regards the egg-plants, is hand-picking two or three times a day, a remedy where, from the size of the garden, it can be adopted, the most efficacious that can be devised.

June 5. The *Nematus ventricosus* appeared upon the currant bushes. A watering with hellebore and water proved, as usual, an unfailing specific.

June 16. I captured an *Elater occulatus.*

June 19. *Sesia diffinis.*

June 24. *Saturnia io*, ♀, 2¼ inches in expanse.

July 4. The Fireflies, *Lampyris corusca*, first appeared, enhancing, by their glittering, glancing evolutions, the charms of the evening hours.

July 10. I captured a *Saperda tridentata.*

August 17. *Buprestis Virginica.*

August 19. Camping out with a party on one of the granitic islands of our most beautiful and romantic Stony Lake. Saw a large number of those exquisite little beetles, the *Chrysochus auratus.*

August 20. Red Admiral butterfly, *Vanessa atalanta* (Westwood).

August 26. *Arge* tiger-moth.

August 28. *Silpha vespillo* (Samouelle).

August 30. *Buprestis dentipes.*

September 5. I captured in my garden a good specimen of that very lovely moth, *Deiopeia bella.*

September 20. Found a common cricket, *Acheta abbreviata*, with a hair snake, *Gordius*, attached to it. Whenever the unhappy victim moved the snake appeared to lash itself into a perfect fury, twisting itself around the cricket in all directions.

October 20. I found a chrysalis of the Five-spotted Sphinx, *Sphinx quinquemaculatas*, which I now have by me still alive.

On the same day, the thermometer on the preceding night having run down to 32°, I captured a brilliant specimen of *Vanessa progne.*

October 21. Dug up in my garden a quantity of grasshoppers' eggs enclosed in a pellicle of dried varnish.

VINCENT CLEMENTI, B. A.

Peterboro, January 28th, 1876.

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The Canadian Entomologist.

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THE RELATIONSHIP OF THE EARLY SPRING BLUES.

BY SAMUEL H. SCUDDER, CAMBRIDGE, MASS.

The simple fact which Mr. W. H. Edwards published in this journal last May* has thrown great doubt over the relationship of all the American species of Cyaniris. From eggs laid in September, 1874, by *C. Pseudargiolus*, he reared in the following February *C. violacea*. From this fact he is led to conjecture that in W. Virginia, where his experiments were made, *C. neglecta* may prove to be a goneutic form of the same species, reducing the entire series in that district to one. He also infers that further north *C. Lucia* and *C. neglecta* are forms of one species, though how this can be reconciled with the previous conjecture he does not explain.

Against the inference concerning *C. Lucia* and *C. neglecta*, Messrs. Saunders and Lintner reasonably urge† that *C. Lucia* is unknown in well worked districts where *C. neglecta* is abundant. This would at first seem to disprove any such relationship between them; but when it is remembered that *C. Pseudargiolus* exists in abundance in California, in districts well explored by resident collectors, while *C. violacea* (raised by Mr. Edwards from *C. Pseudargiolus*) has not yet been found; then we must conclude either that the *Pseudargiolus* of California is a different species from the *Pseudargiolus* of W. Virginia (whereas specimens from the two countries are wonderfully alike), or else that *C. neglecta* may be genetically preceded by *C. Lucia* in one place and not in another.

In writing to Mr. Edwards I also objected, as he remarks in a note appended to his paper, that in Massachusetts *C. neglecta*, *Lucia* and *violacea* all appear in May; but this statement, as Mr. Edwards surmises, is incorrect, and must have been made from memory. To illustrate the subject

* Vol. vii, pp. 81-2.

† This journal, vii, pp.

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I append to this paper full extracts from the account of the different species of Cyaniris, as written several years ago for my book on New England Butterflies, omitting only that of *C. Pseudargiolus*, as I had nothing to add to Mr. Edwards' account in the "Butterflies of North America."

These considerations, and the hypothesis presently to be offered, show that observations are needed in many different places upon the succession of the broods of all the forms of Cyaniris. Fruitful results would surely follow from a series of complete observations for a single season in such separated localities as W. Virginia, Philadelphia, the Catskills, Albany, Boston, the White Mts., Quebec, Montreal, London, Ont., Detroit, Chicago, St. Louis, Lawrence, Ks., Denver, Col., and San Francisco—all, excepting Denver and the mountains, places where there are resident collectors. The present article is written for the purpose of drawing attention to this point.

In W. Virginia, three forms of Cyaniris appear: First, one *(violacea)* of medium size, in which the spots on the under surface of the wings are of medium size and distinct, and the marginal markings are cloudy angular lunules; in which some females are wholly brown above, and others blue with a heavy brown border. Second, and later, one *(Pseudargiolus)* of large size, in which the spots on the under surface are scarcely more than dots and very light, and the marginal markings are cloudy angular lines; in which all the females are blue above, but with a dash of white in the middle of the fore wing. And third, occasionally, a form *(neglecta)* almost wholly like the latter, but smaller.

In Albany and London, which, zoologically speaking, are more southerly stations than the vicinity of Boston (or, rather, situations more accessible to southern influences), the second of the forms just mentioned does not seem to have been recognized.* As far as I am aware, the females of the first *(violacea)* are always blue.

In the neighborhood of Boston we have: First, a small species *(Lucia)*, in which the spots on the under surface of the hind wings are very large, usually completely confluent and often suffusing nearly the whole base of the wing, and the marginal markings tend to form a broad band with serrate interior margin; in which the females, always blue, have seldom any trace of pale color on the upper surface of the fore wings.

* Lintner, however, catalogues it from New York.

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Second (later), a form precisely like the *violacea* of W. Virginia, but with the female never brown. Third (still later), a form with faint markings corresponding to the *neglecta* of W. Virginia; occasionally in midsummer large specimens of this are taken, and these I have considered *Pseudargiolus.*

In all these places the earliest forms, or those called *violacea* and *Lucia,* have the disc of the upper surface of the fore wings of the female blue (excepting, of course, the brown females of the southern *violacea*), untinged or scarcely tinged with white; while the later forms always have a whitish blotch or dash on the fore wings of the female.

In California and Oregon three forms occur, but at what seasons I cannot say; two of these altogether correspond to the *Pseudargiolus* and *neglecta* of the East, while the third (*Piasus*) is as large as the former and has much heavier markings beneath, but the females are strongly marked with white on the upper surface of the fore wings.*

With this last exception, the specimens of Cyaniris in any one locality seem to become larger, more lightly marked beneath and to show a stronger tendency to paleness on the upper surface of the female as the season advances. In view of this, and of the known relationship of *C. violacea* and *C. Pseudargiolus* in W. Virginia, may it not be possible that there is but a single species of Cyaniris in N. America? For this, it is necessary to assume some such hypothesis as the following, which is suggested solely in the hope of stimulating investigation and arriving at perfect knowledge: That in W. Virginia the first brood of this single species appears as *violacea* with both brown and blue females; the succeeding broods as *Pseudargiolus*, with occasionally (perhaps in seasons unfavorable for the growth of the larva or its food-plant) a few individuals of smaller size (*neglecta*). That in New York and Ontario, the first brood appears as *violacea* with only blue females; and the succeeding broods as *neglecta* with occasionally a few larger specimens (*Pseudargiolus*); this being the centre of the latitudinal range of the insect, the distinction between the broods would appear less marked than elsewhere. That in New England and further north the first brood appears as *Lucia and violacea*—the earlier individuals of the brood *Lucia*, the later *violacea*, just as the first brood

* A species of Cyaniris exists in Western Texas, but I possess only females. These resemble *C. neglecta* more closely than any other of the known forms, but are much paler throughout. They were taken between the middle of September and the middle of October.

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of *Ajax* is made up in W. Virginia of an earlier appearing *Walshii* and a later *Telamonides;* the subsequent broods as in New York. That in the high north there is a single brood—the spring form *Lucia* alone. That in California (until we have further knowledge) the early spring brood is absent and the summer broods are made up of *Pseudargiolus* with occasional smaller (*neglecta*) and occasional more heavily marked (*Piasus*) individuals. On this hypothesis, *Lucia* is a boreal and colline form of *violacea*, and the summer broods of the species are absent in the extreme north, or, further south, consist of larger (*Pseudargiolus*) and smaller (*neglecta*) individuals, according to conditions more or less favorable to growth.

Of course this hypothesis is based principally upon my personal knowledge of the sequence of forms in New England, and may prove altogether wrong. I believe, however, that it is worth considering. If it appear complicated, it need only be said that there is complication somewhere. And furthermore, while Mr. Edwards in W. Virginia raised *violacea* in the spring from progeny of *Pseudargiolus* which went into chrysalis the *autumn* previous, Mr. Abbot in Georgia years ago raised *Pseudargiolus* (or what he called *Argiolus*) in March from caterpillars which went into chrysalis the last of *April* of the preceding year. The spring brood, therefore, is probably made up, in the south at least, of butterflies which existed as caterpillars at various times during the whole of the previous year. This is precisely what Edwards has admirably proved of *Ajax;* and if it be a constant phenomenon in Cyaniris, then it is likely to be equally true at the north, and the probable occurrence of dimorphism in the first brood at the north (*Lucia-violacea*) would be similar to the same phenomenon in *Ajax* at the south (*Walshii-Telamonides*) and the two features may yet be proved to have a logical connection.

It may also be added that it is extremely uncommon for two such closely allied species as *neglecta* and *Lucia*, living in the same district, to differ as much as it has been supposed they do, in the number of their broods, *Lucia* appearing in New England but once, *neglecta* twice a year*; indeed only one instance among New England butterflies occurs to me, and that is somewhat doubtful. I refer to *Limochores Taumas* and *I Manataaqua*, the former of which is double brooded, and the latter, a far as I know, single brooded; the data, in the latter case, however, ar

* The second brood appears to be invariably less abundant than the first.

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but scant. Still these are butterflies which do not fly before June, while the species of Cyaniris appear early in the spring and thus have a much better chance to develop a second brood. Should my hypothesis of the Californian Cyaniris be brought against me, as presuming a double instead of a triple brood, as in Eastern America, I would reply that there is a much greater difference between monogeneutism and digenutism than between the latter and trigoneutism. It is a much more common thing for a digoneutic insect to become trigoneutic in a southern station, than for a monogenutic to become digoneutic under those influences. Therefore, knowing that the form *neglecta* appears twice a year, it should be regarded, *a priori*, as probable that *Lucia* is succeeded by another brood (not necessarily resembling it) the same season.

As to the European *C. Argiolus*, it is double brooded, but I do not find reference to any difference between the broods.

In this paper, for readier comparison with what has been previously written, I have used the terms *Pseudargiolus*, etc., as Edwards employs them. It is plain to me, however, that the *Pseudargiolus* of Boisduval and LeConte is the form described by Edwards under the name of *violacea*, and I have so placed it in my revision of the species of this group, recently presented to the Buffalo Society of Natural Sciences.

Appendix; On the Seasons of the Species of Cyaniris in New England.

C. NEGLECTA.—Like the preceding species [i. e., *C. Pseudargiolus*] this insect is double brooded, hybernating in the chrysalis state. The earliest males appear at or shortly before the middle of May, but do not become abundant before the last week in the month; the first females appear about ten days later than the males, but are still rare at the beginning of June, although they disappear toward the end of the month or early in July. The eggs are probably laid in the middle and latter part of June and most of the caterpillars become full grown in the early part of July; how long a time is passed in the chrysalis is unknown, but the earliest butterflies of the second brood appear about the first of July and continue to emerge from the chrysalis until the first of August; they become abundant by the middle of July, although the males are often still greatly in excess in the latter half of the month, and in spite of their great delicacy these insects may still be seen in September. This brood

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does not appear to be so abundant as the first; we have no knowledge whatever of its subsequent history; probably the eggs are laid in August and hatch at once, the caterpillars attaining their growth in the latter part of September and transforming to chrysalids before winter.

C. VIOLACEA [after quoting Mr. Edwards' statement of its seasons in W. Virginia, as given in the Butterflies of N. America, the account continues]—In the north, however, it appears and disappears much later, for it makes its advent during the first week in May, both sexes becoming abundant toward the end of the month, and it still remains upon the wing throughout June; one specimen has been taken in Walpole, N. H. (Smith), as late as the 7th of July. Of its further history we know nothing; probably the eggs are laid in June and the caterpillar transforms in July, the chrysalids remaining unchanged until spring.

C. LUCIA.—It is a single brooded insect and the first of our butterflies to appear fresh from the chrysalis in spring. The earliest specimens gladden our eyes about the middle of April, although often delayed a week by inclement weather; the earliest recorded date is that of April 14 (W. Roxbury, Mass.-Faxon). It becomes abundant a week after its advent and continues so throughout the first half of May, when it begins rapidly to decrease and by the end of the month is seldom seen. In elevated and northern localities it is unquestionably later in its appearance and disappearance, since male specimens (rubbed indeed) have been taken in Williamstown, Mass., as late as the middle of June (Scudder), in the White Mts. not uncommonly up to the 17th of the month (Scudder), and occasional specimens even on the 23rd–24th (Sanborn), while in Quebec it is "very abundant at the end of May" (Bowles), and in Southern Labrador was "common from the first of June to the end of July" (Couper). In Alaska, the females taken during the first week in June (Dall) were rubbed, but this may have been due to poor collecting implements. In New England the eggs are laid towards the middle of May; this state probably continues a week, but how soon the caterpillar becomes full grown is unknown; it undoubtedly hybernates in the chrysalis state.

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CAPTURES OF NOCTUIDÆ NEAR ORILLIA, IN THE PROVINCE OF ONTARIO, CANADA.

BY GEO. NORMAN, CHERRY HILL, FORRES, SCOTLAND.

During the season of 1875 I collected Noctuæ near Orillia, in the Province of Ontario. The locality where I resided was the Couchiching Hotel, a place of great beauty, situated on a wooded isthmus dividing Lake Couchiching from Lake Simcoe.

From the varied nature of the ground, enormous forest tracts, swamps, etc., I fully expected the locality would have been more productive in insects than my last year's place of sojourn, St. Catharines, which was, comparatively speaking, very poor and with very little timber. In this I was much disappointed, possibly owing more to the bad season than to the locality. The season was an unusually cold one. This, combined with the high and cold winds which prevailed at nights during the whole summer, was very much against sugaring, and certainly rendered it one of the very worst collecting seasons I ever experienced.

I may here mention that Mr. F. Grant, who has resided at Orillia some years, has found *Agrotis fennica* not unfrequent on a species of Spiræa, visiting the flowers. He has also taken *Plusia striatella*, *M. Comstockii*, *Agrotis gilvipennis*, *Adita chionanthi* and other rare Noctuæ.

In sending a list of my captures to the CANADIAN ENTOMOLOGIST, I have deemed it advisable, in order to prevent confusion, to adopt the arrangement and nomenclature of Mr. Grote's lately published "Check List." In spite of the above mentioned drawbacks, it will be seen that the locality has not failed to yield a few species new to science. These have been kindly determined and described by Mr. Grote, of Buffalo, to whom my best thanks are due. The following species may be added to my list of St. Catharines captures: *Agrotis decolor*, *Acr. vinnula*, *H. badistriga*, *P. angulata*, *A. plecta*, *T. v-brunneum*, *A. gladiaria*.

Raphia frater. July 4th; rare at light.
Momophane (*Diphtera*) *Comstockii*. (Mr. Grant).
Diphtera fallax. July 2nd; at sugar; not uncommon.
Apatela (*Acronycta*) *occidentalis*. June 7th; common at rest and sugar.
——— *morula*. July 7th; not uncommon at sugar.

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Apatela hasta. June 20th ; rare at sugar.
——— *innotata.* July 11th ; common at sugar.
——— *hastulifera.* July 15th ; rare at sugar.
——— *noctivaga.* June 15th ; common at sugar.
——— *superans.* July 11th ; not uncommon at sugar.
Agrotis sigmoides. June 21st ; bred from larvæ ; afterwards frequent at sugar.
——— *haruspica.* July 15th ; very common at sugar.
——— *phyllophora.* July 22nd ; rare at sugar.
——— *baja.* Jnly 29th ; very common at sugar.
——— *C. nigrum.* June 24th ; bred from larvæ ; very frequent at sugar.
——— *bicarnea.* June 17th ; bred from larvæ ; very abundant at sugar.
——— *herilis.* August 11th ; not unfrequent at light and sugar.
——— *tricosa.* August 18th ; rare at light and sugar.
——— *badicollis.* August 4th ; not rare at rest.
——— *rubifera, n. s.* July 24th ; very common at sugar.
——— *conflua.* August 11th ; rare at sugar.
——— *Normaniana.* August 11th ; common at sugar ; much darker than St. Catharines specimens.
——— *plecta.* July 16th ; not uncommon at sugar.
——— *gularis, n. s.* August 12th ; not uncommon at flowers, sugar and light.
——— *cinereomacula, n. s.* July ; not unfrequent at flowers.
——— *turris, n. s.* August 20th ; not unfrequent at sugar and light.
——— *friabilis, n. s.* August 4th ; rare at sugar.
——— *versipellis, n. s.* June 20th ; not unfrequent at light.
——— *campestris, n. s.* Not uncommon at light and sugar.
——— *tesselata.* July 11th ; very common at sugar and light.
——— *clandestina.* June 27th ; bred from larvæ ; very common at sugar.
——— *alternata.* August 8th ; very common at sugar.
——— *cupida.* August 25th ; very common at sugar.
——— *messoria (Cochrani).* August 2nd ; swarming at sugar and light.
——— *saucia.* July 7th ; exceedingly common at sugar.
——— *suffusa.* August 12th ; very abundant at sugar.
——— *venerabilis.* September 9th; rare at light.
——— *pressa (Aplecta).* July 5th ; common at rest and sugar.

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Agrotis occulta (*Aplecta*) August 16th ; not rare at sugar.
——— *prasina* (*Aplecta herbida*). July 8th ; very common at sugar.
Pachnobia Orilliana, n. s. May 13th ; not unfrequent at palms.
Matuta Catharina. May 10th ; not uncommon at palms and light.
Mamestra vicina. August 4th ; rare at rest.
——— (*Aplecta*) *nimbosa.* July 14th ; not uncommon at sugar.
——— (*Aplecta*) *imbrifera.* Bred from larvae often, and at sugar.
——— *atlantica* = *H. suasa ?* June 21st ; rare at light.
——— *albifusa.* June 7th ; very common at rest.
——— *claviplena.* June 2nd ; common at sugar.
——— *olivacea.* August 6th ; common at rest and sugar.
Hadena arctica. July 9th ; very abundant at light, rest and sugar.
——— *devastatrix.* July 1st ; the most abundant moth at light, rest and sugar.
——— *apamiformis.* August 7th ; rare, one specimen at light.
——— *sputatrix.* July 12th ; exceedingly common at sugar.
——— *dubitans.* July 19th ; rare at sugar.
——— *sectilis.* June 28th ; not uncommon at sugar.
——— *mactata.* August 19th ; very abundant at sugar.
——— *modica.* August 14th ; not uncommon at sugar.
——— *fractilinea.* August 24th ; not uncommon at sugar.
——— *chalcedonia.* June 14th ; not common at sugar.
——— *renigera.* July ; very common at rest and light.
Dipterygia scabruiscula (*Pinastri*). July 1st ; not unfrequent at sugar and rest.
Hyppa xylinoides. June 12th ; very common at sugar and rest.
Actinotia (*Cloantha*) *ramosula.* August ; one specimen at light.
Callopistria mollissima. August 12th ; rare ; one specimen at sugar.
Conservula anodonta. July 21st ; not uncommon at sugar.
Trigonophora periculosa. July 21st ; not rare at sugar.
——— *v-brunneum, n. s.* July 24th ; not rare at sugar.
Euplexia lucipara. June 9th ; frequent at light and sugar.
Brotolomia iris. June 21st ; rare at light.
Nephelodes violans. August 21st ; very frequent at light, rest and sugar.
Helotropha reniformis. August 12th ; very abundant at sugar.
——— *atra, n. s. ?* With the last, but not so frequent.
Hydroecia nictitans. July 17th ; very common at sugar.
——— *sera.* July 15th ; common at sugar.
Arzama obliquata. July 14th ; rare at light.

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Heliophila pallens. July 16th ; rare at sugar.
——— *unipuncta.* June 21st ; very common at flowers and sugar.
——— *pseudargyria.* July 15th ; rare at sugar.
Laphigma frugiperda. September 6th ; rare at sugar.
Caradrina miranda. August 9th ; rare at sugar.
——— *multifera.* August 8th ; very abundant at sugar, light and rest.
Pyrophila (*Amphipyra*) *pyramidoides.* August 7th ; very abundant at sugar.
——— *trogopoginis.* August 8th ; common at sugar and rest.
Parastichtis gentilis. July 25th ; rare at sugar.
——— *perbellis.* July 18th ; rare at sugar.
——— *minuscula.* September 9th ; rare at light.
Crocigrapha Normani. May 17th ; not uncommon at palms.
Tæniocampa alia. May 20th ; very rare at palms.
——— *oviduca.* June 9th ; very rare at light.
Orthodes infirma. July 10th ; common at sugar.
——— *cynica.* July 18th ; common at sugar.
Eucirrædia pampina. August 24th ; abundant at sugar.
Orthosia infumata. September 12th ; rare at sugar.
——— *ferruginoides.* August 29th ; very common at sugar.
——— *togata* (*silago*). September 10th ; not common at rest and sugar.
Scoliopteryx libatrix. Very common at sugar all the season.
Litholomia napæa, n. g. et sp. May 11th ; rare at sallows.
Lithophane (*Xylina*) *petulca.* September 10th ; very abundant at sugar.
——— *ferrealis.* September 2nd ; common at sugar.
——— *Bethunei.* September 2nd ; swarming at sugar.
——— *semiusta.* May 18th ; rare at palms. September 9th ; common at sugar.
——— *Georgii, n. s.* September 5th ; not uncommon at sugar.
——— *disposita.* Rare at palms in May ; abundant in Sept. at sugar.
——— *cinerea.* Rare at palms in May ; September 15th, occasionally at sugar.
——— *laticinerea.* September 15th ; rare at sugar.
——— *oriunda.* September 8th ; rare at sugar.
Anytus sculptus. August 21st ; rare at sugar.
——— *capax.* September 14th ; rare at sugar.
Calocampa nupera. May at sallows. September 11th ; common at sugar.
——— *curvimacula.* May at sallows. September 14th ; not uncommon at sugar.

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Lithomia germana. September 5th ; very abundant at sugar.
Plusia aereoides. August 7th ; not common at rest.
—— *purpurigera.* August 1st ; at thistle blooms.
—— *bimaculata.* August 28th ; rare at rest.
—— *striatella.* (Mr. Grant).
—— *simplex.* June 8th ; rare over flowers.
—— *u-aureum.* September 9th ; rare at light.
Pyrrhia exprimens. August 2nd ; rare over flowers.
Galgula hepara. September 9th ; rare at rest.
Eustrotia carneola. June 12th ; common at rest and sugar.
——— *nigritula.* July 9th ; not unfrequent at sugar.
Drasteria erichto. May 2nd ; not common.
Parallelia bistriaria. July 2nd ; not unfrequent at sugar.
Catocala relicta. September 10th ; saw several at sugar.
——— *unijuga.* August 14th ; not common at sugar.
——— *Briseis.* July 21st ; common at sugar and rest.
——— *parta.* August 29th ; rare at sugar.
——— *ultronia.* Jnly 27th ; common at sugar and rest.
——— *concumbens.* August 11th ; not common at sugar.
——— *ilia.* August 12th ; rare at sugar.
——— *antinympha.* (Mr. Grant).
——— *cerogama.* August 11th ; very common at sugar.
——— *præclara.* August 2nd ; not unfrequent at sugar.
——— *fratercula.* August 18th ; rare at sugar.
——— *gracilis.* August 11th ; rare at sugar.
Homoptera calycanthata. May 28th ; common at sugar.
Pseudaglossa tubricalis. One of the most abundant at sugar throughout the season.
Epizeuxis Americalis. Exceedingly common at sugar.
Xanclognathe lævigata. Rare in July.
——— *ochreipennis.* Not unfrequent at sugar in July.
Renia plenilinealis. August 24th ; not unfrequent at sugar.
Bleptina caradrinalis. Not common at sugar in July.
Bomolocha perangulalis. July ; very abundant at sugar.
——— *abalienalis.* July 20th ; common at rest and sugar.
——— *Baltimoralis.* Very frequent at sugar.
——— *hijugalis.* June ; not unfrequent at sugar.
Hypena subrufalis. August ; not unfrequent at sugar.

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Hypena evanidalis. August 13th; rare at sugar.
Platyhypena scabra. Common at sugar.
Bruphos infans. At birch trees in May (Mr. Grant).

NOTES ON CATOCALAS.

BY THE EDITOR.

For several years past we have had in our possession bred specimens of a small species of Catocala near *polygama*, which we have been unable to refer with certainty to that species, and yet in the imago state the differences between the two are so inconspicuous that we have felt a hesitancy in describing the one as distinct from the other. There is, however, what appears to us to be a strongly marked difference between the larvæ of the two species, and chiefly on this ground we have been induced to describe them as distinct. The larvae of both species feed on thorn.

Catocala cratægi, n. s. Larva. Specimens taken by bush beating about the middle of June. Length about one and a half inches, onisciform. Head flat, medium sized, slightly hairy, grayish, with a few blackish streaks and dots; bilobed, each lobe tipped with reddish, mixed with white; these colors margined before and behind with blackish brown, in which are dots of a paler hue; sides of head pale greenish white, with a faint network of brownish lines.

Body above greenish ash color, with many minute dots of brownish black, some of them forming indistinct and imperfect lateral streaks; dorsal line very slightly paler than general color. Second and terminal segments with a number of small whitish dots, each emitting a single hair. On each side of the dorsal line is a row of small tubercles, those on third segment whitish tipped with black, on fourth reddish tipped with dull white; on the remaining segments they are a little larger and decidedly red tipped with whitish. Between each of these, and running in the same direction, is a small whitish dot or minute tubercle; each and all of these tubercles emit a single brownish hair. The upper portion of the ninth segment is raised, *and on its centre there arises a thick, fleshy horn*

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about one-tenth of an inch long, slightly curved backwards, of a dull dark reddish color, thickly dotted with black about the base. The usual dark patch on ninth and tenth segments is wanting, excepting close to under surface, where it is faintly visible. Twelfth segment scarcely raised, with no black streak behind, but having a faint line formed by a row of black dots extending obliquely down the sides towards the front. Terminal segment flattened; lateral fringe of a decided rosy pink hue; spiracles whitish encircled with black.

Under surface whitish green, with a tinge of blue; a central row of brownish black spots larger and deeper in color on seventh and eighth segments, decidedly paler on second, third and fourth, and of a reddish brown on segments from ninth to thirteenth inclusive. Feet pale greenish, faintly marked with brown; prolegs bluish green, hinder three pairs streaked and dotted with black.

Occasionally specimens not full grown have been met with of a darker shade, arising from their being more thickly dotted with black; in these the tubercles have been less decidedly red, while the fleshy horn approached the general color, but was thickly covered with blackish dots.

The moths produced from this larva very much resemble *polygama*, but are smaller. The brown filling of the subterminal space is obsolete or very pale; the transverse posterior line has the lower tooth very small, while the line itself is narrow; in *polygama* the teeth are sub-equal; the sub-costal angulation of the line is also less pronounced and the sub-reniform is connected with and very near the transverse posterior line. In 25 specimens of *polygama* the sub-reniform is connected with the transverse posterior line only in a single specimen. The transverse posterior line between the lower discal tooth and vein 2, where it joins the sub-reniform, is more directly oblique and even; in *polygama* this line, though sometimes uneven, seems to form a regular curve. The transverse anterior line appears to be more regularly arcuate. The hind wings and under surface are almost identical with *polygama*. From both sexes carefully examined we are unable to give any further points of difference.

We would here remark that in six additional specimens of *polygama* the lower tooth of the t. p. line is smaller than the upper. Possibly none of the points of difference urged are in themselves invariable, nor perhaps such as would suggest the separation of the species; at the same time, it is possible that some essential differences may have escaped our

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observation. The differences in the larva, to be presently referred to, will, we think, excuse us for regarding the species, at least for the present, as distinct. All the specimens referred to, including an example of the larva preserved in alcohol, have been submitted to Mr. Grote, who thinks the species are probably distinct.

Larva of *Catocala polygama* found feeding on thorn about the middle of June. Length about one and three-quarter inches. Head flat, sprinkled with fine brownish hairs; bilobed, each lobe tipped with whitish; color ashy grey with a wide black band above extending obliquely down the sides, in which are several dull faint reddish streaks.

Body above greenish grey, dotted with very minute blackish dots; on the anterior portion of second and third segments there are a few whitish dots, each emitting a single hair; a broken dorsal stripe of a paler hue imperfectly margined with black, the stripe becoming whiter on hinder portion of fifth, sixth, seventh, eighth and tenth segments. On fifth and sixth segments are two whitish patches similar in form, almost pointed anteriorly, posteriorly enlarging with the hinder edge concave, thus giving the widened portion a bilobed appearance; posterior portion of fifth segment rather darker than general color, with a slight purplish tint; hinder portion of ninth segment *slightly* raised and of a deeper color, the dark patch covering the anterior portion of tenth segment and extending down the sides close to under surface. Posterior portion of twelfth segment slightly raised and margined behind with black, the same color extending obliquely down the sides towards the front. On each segment there is a small tubercle on each side the dorsal line, of a greyish hue, but so small as to be scarcely visible, excepting those on twelfth segment, which are somewhat larger. Terminal segment flattened and spreading, with a few whitish dots on its hinder portion and two reddish brown tubercles on anterior portion. Lateral fringe close to under surface of a delicate pinkish tint; spiracles blackish.

Under surface whitish green with a tinge of blue, with a central row of blackish spots larger and deeper in color along the middle, smaller and paler towards each end. Feet and prolegs greenish, dotted and streaked with brown or brownish black.

Var. A.—Rather paler in color, dark patch on ninth and tenth segments and whitish patches on fifth and sixth segments less prominent, dark patch on fifth segment almost wanting; small tubercles on each side the dorsal line more apparent; spiracles brownish, faintly edged with white.

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Var. B.—General color with a stronger tinge of green, and an indistinct pale irregular stripe on each side (this character is also faintly visible in specimens of Var. A); whitish patches on fifth and sixth segments faint; small tubercles same as in Var. A.

Var. C.—Much paler in color than either of the other varieties, with the body of a decidely greenish tint. Dorsal stripe very faint; light patches on fifth and sixth segments scarcely visible; small tubercles on each side the dorsal line blackish or brownish black, and in consequence of the paleness of general color, appear more prominent; dark patch on fifth segment wanting, that on ninth and tenth segments present, but rather paler than in the other varieties; lateral fringe very pale, with a slight pinkish tint. Spiracles dark, faintly encircled with whitish.

In all these varieties the markings on the head are constant in the two species; the peculiar shaped patches on fifth and sixth segments in *polygama* are constant, but vary in distinctness. The small dorsal tubercles in *cratægi* are always more or less red, but the most prominent and valuable point of distinction is to be found on the ninth segment, which in *polygama* is never more than a slightly raised fold, while in *cratægi* it is invariably a distinct thick fleshy horn, about uniform in size. This one character will enable any collector instantly to separate the larvæ of the two species.

NOTES ON LEPIDOPTERA.

BY C. P. WHITNEY, MILFORD, N. H.

Thyreus Abbottii. Larva.

The larva of *Thyreus Abbottii* possesses a peculiar interest to the Entomologist, as it is the only species of which the sex is supposed to be indicated by the coloration. Frequent reference to this is found in works of different authors, and nowhere have I seen any doubt expressed about the validity of the distinguishing markings between ♂ and ♀ (*vide* Harris' Ent. Correspondence, p. 284; N. Y. State Museum Report, p. 114; CAN. ENTOMOLOGIST, 1874, p. 146).

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In the season of 1873 I received from a friend eight of the supposed ♀ larvæ fully grown, taken on Sweetwater Grape. As I previously had reason to doubt the correctness of the theory that all with the uniform brown mottling were of one sex, I watched with considerable interest the next year's development.

May 16th, there appeared in the breeding box one ♂, one ♀ imagines; the 18th, another ♂ emerged, and the next day another ♀.

Being absent for some time afterward, I made no note of the remainder of the brood, nor do I now recollect if any more were disclosed.

None of these larvæ had any appearance of the green markings, nor have I ever seen any captured here which had, but have seen such in Massachusetts and New Jersey.

Lerema Loammi, nov. sp.

♂. Expands 1⅛ in. Wings above dark glossy brown, darker basally. Ciliæ light brown, with a blackish line at extreme base. Primaries with a subcostal transverse row of quadrate whitish spots, situate one in each of the three terminal subcostal interspaces near its base; the upper one one-half its length nearer apex. A larger sub-quadrate spot crossing second median interspace at one-third the distance from its base. An obsolescent transverse line in lower median interspace, equidistant between its base and spot in second interspace. A narrow black sexual bar broken by first median nervule; the upper portion straight, commencing at second divarication of median nervure and crossing the interspace to first median nervule near its source. The lower portion of the bar commences below the nervule about its own width removed outwardly, is strongly concave within, and reaches submedian nervure about two-fifths its distance from base. Secondaries immaculate.

Beneath dark chestnut brown. Apex of primaries and border of secondaries with a bloom of pearly scales. Primaries with upper markings repeated and two minute dots in subcosto-median interspace, resting one on each nervule; one in first median interspace and a transverse line in third. These five (including one in second interspace repeated above) are in a line from apex to middle of internal margin.

Secondaries with a curved sub-basal row of three small irregular white spots. The first is in the costo-subcostal interspace one-fourth the distance from its base; the second in the subcosto-median interspace, and

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the third on the submedian nervure. A subterminal sinuate row; the first double, situate in the costo-subcostal interspace midway between its other spot and its extremity. A black streak running from this spot sharply outward to next spot in subcosto-median interspace, which is followed in the succeeding interspaces by five more small transverse spots. All the spots of secondaries with a black border.

♀. Expands 1½ in. General coloration a little lighter than in the male. Primaries above with two spots at extremity of disc. An irregular transverse band commencing with three subcostal spots, the upper one not removed outwardly as in the male; the fourth twice its own width nearer margin; the fifth in a line with first three; the sixth twice its width nearer base; the seventh largest, removed its width internally; the eighth double or with upper half obsolete. Lower surface of primaries with upper markings repeated. Secondaries with basal row inconstant. First three spots of subterminal row running toward outward margin; the others running at a right angle from third, toward inner margin. In one ♀ the subterminal row of secondaries is indicated above by a few lighter scales. 1 ♂, 3 ♀, Jacksonville, Fla. March 22nd, 23rd, 1875.

ON PLATYSAMIA COLUMBIA SMITH.

BY F. B. CAULFEILD, MONTREAL, P. Q.

In No. 4, Vol. ii, of the "Bulletin of the Buffalo Society of Natural Sciences," Dr. H. A. Hagen gives an interesting paper on this moth and its parasites.

After a brief review of the previous literature of the species, Dr. Hagen says: "If *columbia* should happen not to be a distinct species, it must be either a variety of some other species or a hybrid of two species." As regards its being a variety of *cecropia*, Dr. Hagen says that he has examined large numbers of *cecropia*, but never saw a variety agreeing with *columbia;* one small and dark colored male he indeed at first thought was an intermediate form, but on comparing it carefully he found it to be *cecropia*, though a somewhat remarkable variety; he therefore comes to the conclusion that *columbia* is not a variety of *cecropia*.

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My own experience exactly corresponds with this. I have seen many specimens of *cecropia*, both large and small, light and dark, but nothing that would form a connecting link between the two insects. As regards the second eventuality, a hybrid form, Dr. Hagen says that he "believes it possible that *columbia* may be a hybrid, perhaps of *cecropia* and *prometheа:* in favor of its being a hybrid would be the circumstance that such a large species should occur so rarely, while the large number of Lepidopterologists eager to secure this treasure operates against the idea of its being overlooked."

Columbia certainly is very rare, as yet having only been recorded from three localities, Norway, Maine, and Quebec and Montreal, Canada. However, between Maine and Quebec, and Quebec and Montreal, are doubtless many places as yet but little known to Entomologists, where *columbia* may at some future day be found in comparative abundance.

Dr. Hagen says: "The conjecture that *columbia* is a hybrid would not be worth mentioning, if there did not exist similar cases recorded by the most prominent authorities. Of course I speak only of cases of hybrids as imagos or caterpillars, from which imagos, when bred, have been collected in the open fields. The facts just at hand (I have no doubt that more are published) record caterpillars of hybrids of *Saturnia carpini* and *spini*, found in Austria, according to Lederer; caterpillars of *Sphinx epilobii*, a hybrid of *S. vespertilio* and *euphorbiae*, being found in France, according to Rambur; in the same country are found also caterpillars of *Sph. vespertilioides*, the hybrid of *S. vespertilio* and *S. hippophaes*, according to Boisduval and Lederer. The imagos and caterpillars of *Sph. phileuphorbia*, hybrids of *Sph. euphorbia* and *galii*, have been found near Berlin in several specimens. Hybrids of *Zygaena trifolii* and *filipendulæ* were found in the imago state in England; hybrids of *Colias edusa* and *hyale*, of *Lycæna adonis* and *alexis*, of *Hipparchia arcania* and *hero*, of *Cœnonympha pamphilus* and *iphis*, of *Vanessa urticæ* and *atalanta*, are recorded from different countries."

This is an interesting list of hybrids taken at large, and proves (if proof were wanting) that hybrids occur amongst the Lepidoptera, but as there is only one *Saturnian* mentioned, I do not think it gives much support to Dr. Hagen's conjecture regarding *columbia*. I am of opinion that hybrids found at large must have arisen from chance encounters of the species that produced them, and therefore are to be looked for in families whose habits would be likely to bring them together, and in fact, with one exception, such is the case with the hybrids mentioned by Dr.

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Hagen. The Sphinges proper (there is no *Smerinthus* mentioned) all frequent flowers. My friend, Mr. Hibbins, has taken in this locality (Montreal), at a cluster of lilac bushes, during one evening's twilight, examples of *Deilephila chamænerii*, *Sphinx chersis*, *Sph. drupiferarum* and *Sph. kalmia.* Mr. J. A Lintner, speaking of the Noctuid *Cucullia intermedia*, says he has observed them at lilac blossoms associated with *Deilephila chamænerii*, *Amphion nessus*, *Thyreus Abbottii* and *Sesia thysbe.* Many other instances might be cited, but the fact is well known to all collectors that numbers of the Sphingidæ are constantly meeting while in search of food. This is also the case with the Zyganians, at least with the species mentioned by Dr. Hagen, as they not only frequent flowers but actually sleep on them. Edward Newman, in his Natural History of British Moths, says of *Zygæna minos:* "In some favored spots every daisy will have its tenant, and as many as eight or nine are sometimes seen clustered on a single flower of the dandelion." Of course the same rule applies to the Diurnals; I have myself taken in one afternoon, between the hours of two and four, at a patch of wild asters, examples of *Grapta comma* (both forms), *G. faunus*, *G. progne*, *Pyrameis cardui*, *P. huntera* and *P. atalanta*, and once took *faunus*, *comma* and *cardui* with one sweep of the net, so closely were they associated.

With the Saturnidæ, however, the direct opposite is the case; not taking food, they do not visit flowers, being solely occupied in providing for the continuance of their species, the female waiting for the attendance of the male.

Mr. L. Trouvelot, who has bred thousands of *Telea polyphemus*, gives a very full account of its habits in Vol. 1, *American Naturalist.* Speaking of the freshly emerged insect, he says: "The moth remains quiet all day and sometimes all night, and the following day, if the night be cold; but if it be warm and pleasant, at dusk, or about eight o'clock, a trembling of the wings is observed, and then it takes its flight, making three or four circles in the air. The male flies only a few minutes, and then rests for two or three hours in the same place. The female continues to fly about the bushes, and though a virgin, she lays eggs, which are, however, of no use for the propagation of the species; she continues doing so for two or three hours, and then rests all night attached to some plant, probably waiting for her mate. Soon after the female has laid these useless eggs the males become very active and fly in search of the female, whom they soon discover, especially if there is a slight breeze and the air is loaded with vapors."

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If other proof were wanting, this, I think, shows pretty clearly that the female moth gives forth some attraction by which her presence is made known to the male, and I think there must be something peculiar to the female of each species which affects the males of that species only, and by which they are directed to their proper mate, otherwise all would be confusion and there would be no such thing as distinction of species.

Sembling is a method of taking the males of Bombycidæ known and practised by most Entomologists. Are there any instances on record of the female of one species having attracted the male of another?

In the CANADIAN ENTOMOLOGIST, vol. iv, p. 138, Mr. R. V. Rogers, of Kingston, Ont., states that a young female *cecropia* was confined in a box and exposed on a verandah. The first night five male *cecropias* were taken, on the second ten and on the third eight, while in the morning the remains of five others were found, which he supposed had been killed by cats. He also informs us that several specimens of *Telea polyphemus* were taken in the same manner. In the CAN. ENT., vol. v, p. 139, the Rev. C. J. S. Bethune states that on the 19th of June, 1873, he exposed a young female *cecropia* for several nights without success, the evenings being cool. On the 28th, the evening being warm and misty, six male *cecropias* were taken, and as the female had been so long in confinement the experiment was discontinued. Mr. Bethune also tells us that he tried the experiment with a female *promethea*, but as the cocoon had been brought from a distance, no males were attracted.

Dr. Hagen says: "There is perhaps another circumstance in favor of my conjecture. The hybrids of *Tetreao cerogallus* and *tetrix*, known as *Tetreao intermedia*, occur notoriously always when by excessive hunting the males of the first are killed in such a number that the females are obliged to recur to the males of the other species. Now it is not improbable that in times when some species of *Attacus* are extensively damaged by parasites, the interbreeding would be much facilitated."

(To be Continued.)

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NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part II.

BY W. H. EDWARDS.

In 1806, Hübner, as we have seen, printed for his own use and in order that it might be submitted to certain competent persons, to be examined and judged of, the sketch of a plan for the arrangement of the Lepidoptera, called the Tentamen, &c.; and this sketch "was afterwards enlarged and published as the Verzeichniss bekannter Schmetterlinge," as stated by Geyer, Thon's Archiv., vol. 1, p. 28, 1827. What the Tentamen is I have shown in a previous paper, CAN. ENT, vol. viii, Feb'y No., and have given reasons for denying its authority in nomenclature. I will now proceed to show the character of the Verzeichniss and to examine its claims in the same direction.

The Verzeichniss bekannter Schmetterlinge, a Catalogue of Known Butterflies, by Jacob Hübner, Augsburgh, 1816, pp. 431, follows the general plan of the Tentamen. The Lepidoptera are divided into several *Phalanxes*, of which the first is called *Papiliones*, the second *Sphinges*, the third *Bombyces*, &c.

The *Papiliones* are divided into two *Tribes*, called *nymphales* and *gentiles*.

The *nymphales* into 9 *Stirps*, the *gentiles* into 6, and each *Stirps* into many *families*, so that in all there are 62 *families* among the Butterflies; and each *family* is divided into small batches called *coitus* and altogether there are 309 *coitus* of Butterflies.

The *Stirps* are briefly and unevenly defined by characters drawn from the mouth, the "snout" (proboscis), the "ears" (antennæ), the body and wings, and partly from the colors of the wings.

The 1st Stirps of the *nymphales*, called Nereides, is thus defined: "Antennæ thin, but thickened like a club at the end, fore wings narrow

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and long, hind wings broad and long, fore legs pretty long, the legs and feet beset with a pair of light spines at the end of the feet; the thighs pretty spiny; the abdomen very thin, but thickened towards the end." This Stirps embraces what modern authors call the Heliconidæ, and others.

The 2nd Stirps, Limnades, thus: "Antennæ pretty long and knobbed; both wings broad and pretty long; the fore legs short, almost smooth, the legs and feet at their ends beset with a pair of slight spines; the thighs rough, the claws long and almost straight; the abdomen long and thicker towards the end." Embraces the Danaidæ and others.

The remaining Stirps of the *nymphales* are more briefly defined. The 3rd, Napaeæ, thus: "The antennæ long, the fore legs pretty hairy upon the langern (a word to be found in no dictionary), and the abdomen short." Partly covering the Lemoniadæ of modern authors.

The 4th Stirps, Lemoniades, thus: "The wings tolerably common-formed (fast gemeinformig), the abdomen moderately stout and long." Comprises in part Lemoniadæ, Acreidæ, Nymphalidæ (Melitaea).

The 5th Stirps, Dryades, thus: "The antennæ very short knobbed. The wings spotted above with black on an ochre-yellow ground, below pale and marbled." Embraces one section of the Melitaeas, viz., Phyciodes and the Argynnidæ.

The 6th Stirps, Hamadryades, thus: "The wings angular, the lower ones having a sheath in which the body rests." Comprises Vanessidae, Elymniadæ, &c.

The 7th Stirps, Najades, thus: "Antennæ tolerably club-shaped; the wings above dusky, below bright colored, every where spot banded." Limenitis, Ageronia and others of the Nymphalidæ.

The 8th Stirps, Potamides, thus: "Body pretty thick, antennæ club-shaped, the wings strong and considerable." Mainly the Morphidae.

The 9th Stirps, Oreades, thus: "The palpi pretty roughly haired; the antennae delicately bent down at the end and club-shaped; the wings with eye like spots, white pupilled; the legs very weak." Embraces the Satyridae and others.

Of the *gentiles*, the 1st Stirps, Agrodiaeti, is thus defined: "The palpi naked at the ends; the cheeks white margined; the antennae tolerably short, long-knobbed; the legs, especially the fore legs, short." Includes the Lycaenidae.

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The 2nd Stirps, Archontes, thus: "The palpi entirely hairy; the antennae clubbed, bent; the wings large; the fore legs much like the others, but spineless and the abdomen free." Comprises the Papilios and Parnassians.

The 3rd Stirps, Andropoda, thus: "All the members pretty badly shaped (ziemlich schlechtformig), the wings pale colored and black." Part of the Pieridae.

The 4th Stirps, Hypati, thus: "Palpi large, directed forward, the antennae club-shaped, the wings angled and jagged." The Libytheidae.

The 5th Stirps, Telchinae, includes heterocerous moths, and I omit it.

The 6th Stirps, Astyci, thus: "The forehead broad, the palpi thickly haired; short-snouted; the antennae beset with a little lock on their knoblets, hooked at the end; the wings pretty broad, moderately large." The Hesperidae.*

Now it strikes me that nothing more is needed than to give these definitions in full to show that they are almost if not wholly worthless. If in the 1st and 2nd Stirps of the *nymphales*, and the 2nd and 6th of the *gentiles*, there is a somewhat full definition, embracing the antennæ, palpi, legs and shape of the wings, in the remainder there is a singular indefiniteness and hesitancy. In some the wings are not mentioned at all (Napaeæ, Agrodiaeti), in others the members are not (Hamadryades, Lemoniades), in others still the antennæ alone are coupled with the

* NOTE.—The language used by Hubner throughout this volume is uncouth and that of an unlettered man, a condition not at all incompatible with skill in delineating and coloring. Consequently, while his plates are models of excellence, his text is boorish. To him, fore wings are pinions, schwingen; hind wings sinkers, senken; the fore legs arms, aerme; the antennæ ears, ohren; the proboscis a two snouted nose, 2weischnaubigen nase, &c. One of the coitus of the Astyci is thus characterized: "The wings spotted with white like a sausage," which is Hubnerian for mottled. Dr. Hagen, to whom I applied for light respecting certain words, writes thus: "Hubner was illiterate. His language cannot be called in any sense plain German. He invented a number of words for things and parts for which words existed long ago in German, and were used and adopted fifty or even a hundred years before Hubner. Apparently he had no knowledge of these words or of the works in which they were used. The consequence is that neither science nor even any popular writer has adopted Hubner's words. They are known to nobody, and for some of them the sense can only be guessed. You will find them in no German dictionary. They are simply self-made barbarisms." Geyer, Thon's Archiv., 1827, in his notice of Hubner and his works, calls his language "illiterate (schwunglose sprache), greatly marred by self-made words."

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coloration, not shape, of the wings, and in three especially (Dryades, Najades and Andropoda), the coloration seems to be the essential part of the definition.

Who can possibly know from the definition what is embraced in Napaeae, or in Dryades, or Hamadryades, or Potamides, or Najades, or Andropoda! or in Lemoniades, "the wings tolerably common formed, the abdomen stout and long." What idea does that language convey? Andropoda, "all the members pretty badly shaped," applied to the beautiful Coliades and Teriades! It is the merest rubbish and does not deserve one moment's toleration. Moreover, these divisions accord with no modern system whatever. All through the Verzeichniss, we find that the members of distinct Stirps are ranged by Kirby (whose General Catalogue, 1871, is the latest work of classification of the Rhopalocera, and the one which for convenience I shall mainly use for comparison) in the same sub-family and even the same genus, while, on the other hand, the Hübnerian Stirps, families and coitus dissolve into distinct and unrelated sub-families and genera in Kirby. For example, Melitaea (species Phaeton, Cinxia, &c.) stands in Hübner among the Lemoniades, whose wings are "tolerably common formed," but Phyciodes (species Tharos, &c.), which is closely allied to Melitaea, and has by nearly all authors been considered as but a group under that genus, is put in another Stirps, Najades, where the wings must be intolerably common formed, or tolerably uncommon formed, I do not know which, by the side of the Argynnides. The Vannessidæ go in still another Stirps, and Limenitis in a fourth, and all these and others stand in Kirby in the single sub-family Nymphalinæ. So far as appears, Hübner regarded the barriers which separate these Stirps as substantial as those between any of the series—the Papilios (Archontes) from the Pierides (Andropoda), for instance. As to the species brought within the several Stirps, every lepidopterist knows that a very large proportion of the Butterflies naturally fall into groups so distinct that the veriest tyro in collecting can scarcely make a blunder in assorting his specimens. And what the tyro sees Hübner could not well help seeing, but the moment there was doubt he was completely at fault, and as a consequence several of his Stirps have no foundation in nature and his definitions of them from necessity are as vague and misty as are those of his families and coitus.

The family divisions are made up almost wholly from coloration, and a large part of the names chosen for them are simply puerile, as voracia, fugacia, sapientes, adolescentes, armati, festivæ, etc. And in assorting

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the species all the ring-streaked go in one family, all the speckled in another. Thus 1st Stirps, Nereides, 1st family, Vitriæ, "both wings centrally transparent;" 2nd family, Fulvæ, "the wings rust-yellow, spotted with black and sulphur yellow." And as might be expected, both the families and the coitus under them being assorted by mere coloration, with the Stirps characters so insignificant, the results are often surprising. Thus Stirps Limnades, 2nd family Ferrugineae, "all wings black margined and white dotted," contains species of Danaidae, our D. Archippus (called Anosia Menippa) being one. But the same definition applies equally well to our Limenitis Disippus (called by Hübner Anosia Archippus), and here of course it is among the Danaidae, though its natural allies are in a remote Stirps, the Najades. But the Najades are defined as "dusky above, bright colored below, every where spot-banded," and Disippus under this sort of classification has no place there. As to the characters derived from the members, they form no obstacle at all to the shifting of a species from one Stirps to another. Nereides has the antennæ "thickened like a club at the end"; Najades has them "tolerably club shaped." And so Disippus may range under either Stirps with this limp style of characterization. Another of these Anosians is Misippus Linn., put by Kirby in Hypolimnas Hüb., among the Nymphalinae near Limenitis, and Hypolimnas is also one of the coitus of Najades, defined "the fore wings white spotted, the hind pale banded"! Such instances occur repeatedly, as will hereafter appear, and that not merely between the Stirps of the same Tribe even. Nor need it be deemed strange that in many cases Heterocerous Moths overstep the Phalanx and find their places among the Butterflies.

The value of the family names is so uncertain that authors who reverence the Stirps and coitus names have in a great degree, and, in fact, except in two or three instances, altogether ignored them. And yet if Mr. Scudder's Canon 1 were to have the force of law, each of these 62 family names would have to have place made for it, and be a permanent addition to the nomenclature.

All these divisions, Stirps, families and coitus, are built on the same plan, and are subject to like defects. The family is a magnified coitus, and the Stirps bears the same relation to the family. Some of each may have their equivalents in modern classification, but it is accidental, and the greater part have none. Even were the Stirps homogenous, they could not run with modern families or sub-families. They are both too great and too small. Nor could the families, on same condition, run with

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modern sub-families or with genera. They are of less value than the one and either greater or less than the other. So the coitus are also both greater and less than genera ; often they are plainly nothing but groups or sub-genera, but as often they embrace a heterogenous collection to which no appellation can be given. They are constructed in defiance of any generic principle, whether it be community of descent or structural resemblance. They are precisely what the name *coitus* indicates, an assemblage, a batch, a lot of things brought together, and in this case the tie is not relationship, but a superficial resemblance in which relationship has no part, and by which all natural grouping is violated, and members of distinct genera, of distinct sub-families and families are brought together because they happen to be red or yellow or blue. Hübner struck out a new path for himself, and instead of adopting the systems sanctioned by the usage of his day, or the characters on which such systems were based, he fixed upon the single item of coloration as the unit of his arrangement. This runs from coitus to Stirps and vitiates the whole. As I have said elsewhere, it is exactly as a child would sort his alleys and taws, or as if, according to the illustration of Dr. Boisduval, applied to this very book, a botanist should found his classification upon the colors of the flowers, or the marbling or pinking of the leaves. Or it is as if a zoologist were to sort the mammals by coloration, and put in one genus a black cat, black fox, black wolf, black bear, in another a gray cat, gray fox, gray wolf and a badger; or as if an ornithologist would couple a blue jay and a blue crane, a gold finch and a yellow parrot. It is impossible, therefore, that these coitus can be ranged with genera. They are something essentially different, crude creations of an unscientific mind,* and any attempt to utilize them is like forcing curved lines to lie parallel with straight.

* What good result was possible when such an author attempted to classify all the species of the several divisions of the great order Lepidoptera, never having seen more than a small fraction of the insects themselves and knowing nothing of the remainder except through loose descriptions and from plates like those of Herbst and Esper and Cramer, in which the superficies only is represented and that coarsely and with no heed to exactness. Many of the figures on these plates cannot even now be identified, and are believed to represent insects which have no existence in nature, perhaps manufactured articles sold to confiding collectors by cunning dealers. Treitschke intimates that the dealers palmed on the author of the Verzeichniss varieties for species, and common exotics as rare indigenous. Hubner's contemporaries understood his capabilities and were fully equal to judging correctly his system, and accordingly the Verzeichniss was quietly ignored, and except through his plates, this author exercised no influence on that generation.

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The sooner and more completely this difference between a coitus and a genus is recognised, the better for the nomenclature of the lepidoptera. *And coitus not being genera, and having no equivalent in the nomenclature of the science, the laws regulating the standing of genera have no application to the coitus whatever.*

In the Butterflies of the Verzeichniss are 309 coitus, out of which Mr. Scudder in the Hist. Sketch has "reinstated" 283, as good and proper names of genera, entitled by what he terms "the inexorable laws of priority" to place, whether there be room for them at the feast or not.*

We have seen how Stirps are defined and families. Let us look at the coitus. Beginning at the 1st Stirps, Nereides, 1st family.

1st coitus,	Hymenitis.	Fore wings	half-banded.
2nd "	Ithomia.	" "	once "
3rd "	Oleria.	" "	twice "
4th "	Thyridia.	Both wings	banded.

2nd family, 2nd coitus, Dismorphia, "fore wings small, hind wings large, particolored." And being of that shape and particolored, the species under this coitus, which really are Pierids, and whose natural allies are in the Stirps Andropoda, in the other Tribe *gentiles*, must rank with the Heliconidæ, ten Stirps away. And why? *Because a Pieris as one of the Andropoda has no business to be particolored, that Stirps permitting only those species which are pale colored and black!*

Take Archontes (Papilios), 1st family, 2nd coitus Jasonidae, "hind wings tolerably long and tolerably short-tailed."

3rd coitus, Euphœades, "both wings tolerably broad, brown colored and yellow-spotted." Now one of these definitions is in no way incompatible with the other. Though the wings of Jasonides may be tolerably long, that does not hinder them from being tolerably broad also, and though Euphœades is brown-colored, for aught that appears, Jasonides

* The laws of priority are not inexorable, and such laws anywhere lead only to absurdity and injustice. The author of the Hist. Sketch nowhere hesitates to decide what names of genera are entitled to credit and what are not, and rejects such as he pleases with no regard to the "inexorable" laws. In the Rules of the Brit. Ass'n, the 11th Rule says, "a name may be changed when it implies a false proposition," &c., the systematist of course being judge. And in the notes on this, Prof. Verrill says, "it wou'd be well to exc'ude all names that refer to abnormal structures," &c. Usage condemns profane and blackguard names. The laws of priority, like all human laws, are to be applied with a few grains of common sense; that is all.

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may be brown also. Under the former of these stands our Papilio Turnus, and under the latter the black female of same, or Glaucus. Not a particle of difference between a yellow female Turnus and this black Glaucus, except in the one item of color. But to suit the Hübnerian system the two must lie in distinct coitus! No better illustration of the nature and value of a coitus could be brought forward. It is black cat, black fox, versus gray cat, gray fox. *Are these two coitus genera or sub-genera, or are they groups? They are neither, but something radically different, and which has no equivalent in modern systems and cannot be expressed.* I happen to have an example of female Turnus, called an hermaphrodite, one side of the wings and body of which is yellow, the other black, and which therefore belongs equally to two coitus! The yellow half is Jasonides, the black Euphœades. Does my example therefore belong to two genera!

Mr. A. R. Wallace, President of the Entomological Society, London, in his Anniversary Address of 22nd Jan'y, 1872, Trans. Ent. Soc., uses this language: "We find Hübner's condemnation in almost every page of Kirby, in the utter want of agreement between his groups and modern genera. The modern restricted genus Heliconius contains species belonging to seven Hübnerian genera" (coitus), etc. . . . . while in other cases the species comprising Hübner's groups are divided amongst several quite unrelated genera."

An impression prevails in some quarters that, although the coitus are often composed of heterogeneous materials, yet there are many exceptions, and in such cases, while the former should be rejected, the latter might properly be regarded as natural groups, and accepted as true genera, their names taking precedence accordingly. Mr. Kirby, in his paper on the Necessity of a Reform in the Generic Nomenclature of the Diurnal Lepidoptera, so speaks: "As Hübner relied almost exclusively on *facies*, his genera are both too numerous and too heterogeneous. His genera are usually treated as manuscript" (that is, as entitled to no authority on account of some intrinsic defect, as want of suitable definition, for example), "but unjustly as I now think, though I formerly expressed a different opinion; for on closely examining the work, *many of his genera will be found to be natural.*" And Dr. A. Speyer, in his paper on Eur.-Amer. Verwandtschaften, Stett. Ent. Zeit., 1875, says: *Only those of Hübner's coitus are to be regarded as scientifically established which are either sufficiently characterized, or in which the satisfactory characterization is at least replaced by the fact that the species of the special genus*

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are all brought together under the same generic name without heterogeneous intermixture."

To determine whether homogeneous groups were the rule or the exception, I made an analysis of the Verzeichniss from the beginning as far as the Astyci (Hesperidae), looking out every species and noting its place in Kirby, and this is the result. There is occasionally a coitus co-extensive with the limits of a modern genus, but in all cases solely by reason of some strong peculiarity of color or shape ; as Chrysophanus, which includes the coppers, and is equivalent to Doubleday's genus of same name. But out of 255 coitus preceding the Hesperidae there are but 35 such, and of these, 13 have but one species each, 6 have two and 6 have three ; *so that 25 of the 35 coitus contain but 3 species or less.* Many other coitus are homogeneous, but of this class the species under two, three or several are lumped together by Kirby in one genus, *so that such coitus are plainly regarded as equivalent to something less than genera, and the remaining coitus, 106 of the 255, are made up of species assigned by Kirby not only to distinct genera, but of sub-families and families.* For example, 1st Stirps, 2nd family, 4th coitus, Eueides, under which stand 7 species. In Kirby 1 goes to Eueides Hüb., 2 to Lycorea Doub., 2 to Melineae Hüb., and 1 to Tithorea Doub.

Or 5th coitus, Melineae, 5 species, 1 to same, Hüb., 3 to Heliconius Latr., 1 to Tithorea Doub.

Or 3rd family, 1st coitus, 10 species, 2 to Eueides Hüb., and 8 to Heliconius Latr.

And so Heliconius picks species at random from the 2nd family, 3rd and 5th coitus, and from 3rd family, 1st, 2nd, 3rd and 4th coitus, and from 4th family, 1st and 2nd coitus. And Eueides from 2nd family 4th coitus, 3rd family 1st coitus.

Or 2nd Stirps, Limnades, which comprises the Danaidae, 3rd family, 4th coitus Didonis, 2 species only, one of which stands in Kirby as Didonis Hüb., the 56th genus of the 8th sub-family Nymphalinae, the other as Elymnias Hüb., 1st genus of 3rd sub-family Elymninae. Now the coitus Elymnias stands in the 6th Stirps, Hamadryades, 4th family 5th coitus, *directly among the Vanessans, the species Antiopa being in the coitus next preceding, and Prorsa in the one next following !*

Under the head of Euploea stand 7 species, 6 of which are put by Kirby into Danais Latr. and one in Hypolimnas Hüb., and by a curious swap, the species which Hübner put into three other coitus are lumped

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in one genus called Euploea Hüb.! And besides that the true Euploeas are put to Danais Latr., most of the species belonging to the coitus Hestia and Anosia are also put to Danais Latr., though they stand in two different families. And one of these Anosians, is a Limenitis (Disippus) as before related, while another is a Hypolimnas.

Third Stirps Napaeae, 1st family, 2nd coitus Hamanumidae, 6 species' 3 put by Kirby under same name, Hub., and this genus stands in the 1st family, 8th sub-family Nymphalinae, and 87th genus of same; of the rest, 1 is Aterica Bois., the 88th genus, 1 is Zemeros Bois., of the 2nd family, 2nd sub-family Nemeobiinae, and 1 is Charis Hüb., which stands in the 2nd family, 4th sub-family, Lemoniinae. Now the coitus Charis is one of the Napaeae, as well as the coitus Hamanumidae, which last, as we see, has so gotten among the Nymphalinae; and under Charis are two species only, Gyas and Anius. Kirby puts Gyas into Anteros Hüb., among the Lemoniinae, but looking up Anteros in the Verzeichniss, I find it a coitus of the Stirps Agrodiaeti, or Theclinae; that is, in the other Tribe, *gentiles*, 7 Stirps away from the coitus Charis! That is the sort of wild goose chase one has between these two volumes.

Same Stirps Napaeae, 1st coitus Thysonotis, 2 species, 1 put by Kirby in Cupido Schrank, in the Lycaenidae, that is, according to Hübner, in the Stirps Agrodiaeti, the other in Dynamine Hüb., the 43rd genus of the Nymphalinae. Turning to Dynamine in the Verz., we find it among the Najades, 7th Stirps, thus defined: "the wings white banded below, the hind wings marked by two eye like spots." But Thysonotis was defined: "*both wings colored only at the margins, centrally white.*"

Fourth Stirps, Lemoniades, 1st family, 3rd coitus, Actinote, 4 species, 3 of which go to Acrea Fab., among the Nymphalinae, 1 to Alesa West., in the Lemoniinae.

Second family 1st coitus Melitaea, 6 species, among them Phaeton and Cinxia, all put by Kirby under Melitaea Fab., as are likewise the species of 2nd coitus. Then comes 3rd family, 1st coitus, Byblia, 1 species, put in Hypanis Bois., a genus of Nymphalinae beyond Melitaea in Kirby, by the breadth of all the Vanessidae, and the very next coitus, Cinclidia, has all its species put in Melitaea again.

Fifth Stirps, Dryades, 1st family, Reticulatae, "wings above striped like a grating, the hind wings below with colored spots on a pale yellow ground and marked by eye like spots." 1st coitus, Phyciodes, "both wings above with a band of spots, under side very delicately marked," 2

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species only, one of which is our Tharos, and as these species of Phyciodes form a section of the natural group Melitaea, it is worthy of notice how Hübner's system compels him to put them into a separate Stirps. The 2nd coitus, same family, is Brenthis, "the hind wings below gayly clouded, pale spotted," and here come 5 species, 4 of which are put by Kirby to Argynnis Fab., while the 5th is Euptoieta Claudia, stuck in here because its hind wings are gayly clouded.

Next comes the 2nd family, 1st coitus, Argynnis, 10 species, all of which are put to Argynnis Fab. Then 2nd coitus, 3 species, of which 1 is Argynnis Fab., 1 Atella Doub., 1 Lachenoptera Doub. The 3rd and 4th coitus have all their species put to Argynnis Fab. The 5th, Colænis, 4 species, 2 of which stand as Colænis Hüb., 1st genus of the Nymphalinae, Argynnis being the 12th, and 2 as Eueides Hüb., amongst the Heliconidae. Definition of Eueides: "the fore wings twice spot-banded, the spots all yellow"; of Colænis: "wings striped, nearly plain beneath, the hind wings marked at base with white." !

The 6th coitus has 6 species, 1 put to Messara Doub., 1 to Atella Doub., 1 to Pseudacrea West.. 61 genera ahead of Argynnis, and 3 go to Argynnis. So that Argynnis Fab. picks species from several coitus, situated in two families, among which are Heliconidae, Melitaeas and many distant genera.

The 6th Stirps, Hamadryades, consists of a mixed lot of species, many quite unrelated, and classed by Kirby in several distinct sub-families of the Nymphalidae, namely, in the 2nd, 3rd and 8th. In this last division are the Vanessans, a compact tribe naturally well characterized. The 1st coitus, 1st family, is Vanessa, comprising 3 species, Cardui, Huntera and Carye, and the coitus is defined: "wings above marbled, below with large peacock eyes." The next coitus is Pyrameis, 2 species, Atalanta and Callirhoe, defined: "wings red-banded above, marked like a peacock's tail below." These 5 congeneric species belong to 2 coitus, because 3 are marbled and 2 are red banded! By Kirby all these are classed under Pyrameis Hübner, regardless of the coitus character, which excludes everything that is not red-banded. By Scudder, (Revision, etc.) all are placed under Vanessa of Fab., *not of Hüb.*, which is right. Now where are the rest of the Vanessans, C Album, Antiopa, Io, etc., in the Verzeichniss? Naturally they should at least stand by the side of Cardui and Atalanta. Instead of that they are 3 families away, being in 4th family, 2nd, 3rd and 4th coitus, under the names Polygonia, Eugonia and

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Inachia. Then comes the 5th coitus, Elymnias, placed by Kirby in his 3rd sub-family (the Vanessans being in the 8th) and next follow more Vanessans, viz., Araschnia Prorsa. And between Pyrameis and Polygonia stand Precis, Anartia, Temenes (which includes a Satyrid), Junonia, Apatura, Historides (which last is composed of the species Orion and Marchesius, totally out of place here, and put by Kirby in the 98th and 111th genera, 8th sub-family, Vanessa being 22nd). That is, according to Hubner's notions, *all these intervening species were nearer Cardui and Atalanta than were C album and Polychloros and Antiopa.* Polygonia embraces 4 species, among which are C Album and Progne. One of the rest, C Aureum Linn., under its other name, Angelica Cramer, is also a member of the next coitus, Eugonia, classed with Polychloros and Antiopa, as much at home in one coitus as the other, and a 2nd species of Eugonia, Polynice, is placed by Kirby in Rhinopalpa Feld.

The coitus Apatura is quite another thing from Apatura Fab., the genus recognized by Kirby and all authors, Hubner having had the habit of appropriating names right and left from any author accessible,* and with no credit, using them in altogether other senses than the original. Under it stand 12 species, 6 of which are put by Kirby in Precis Hub., 24th genus of Nymphalinae, 1 in Cymothoe Hub., the 89th, 1 in Siderone, the 111th. But the name Cymothoe is not in this Stirps Hamadryades, being borrowed from 7th Stirps Najades. It must be borne in mind that in every case where a species is taken from one coitus and credited to a genus named from another coitus, violence is done to Hubner's arrangement, and his system, even while made use of, openly condemned.

The 7th Stirps, Najades, comprises another lot even more mixed than the 6th. The 1st family, 2nd coitus, is Callianira, 1 species only, Ephestion Stoll. (our species Ursula), put by Kirby in Limenitis Fab., with the European species Sibilla and Camilla, which in the Verz. stand in coitus Limenitis, separated from the other by 4 families and 20 coitus! And in these 20 coitus are species belonging to all sorts of unrelated genera, Ageronia, Phyciodes, Colaenis, Siderone, etc., etc., *all nearer to Ursula, from the Hübnerian point of view, than Sibilla was.* Why? Because Ephestion is "dusky below, banded and spotted with yellow," while Sibilla is "blackish brown, pale banded below, partly blue, the

* Thus the coitus Hesperia is one of the Napaeae, as is also coitus Lycaena. Hubner proceeded in all respects as if he were the first and only systematist who had treated of the Lepidoptera.

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bands *almost* broken into spots." And far away, in the 2nd Stirps, Limnades, is a third species of this genus Limenitis, namely, Disippus, because its wings are "black margined and white dotted." Here are three congeneric species, differently colored, and therefore placed in three widely separated coitus, and one of them in a distant Stirps! It seems odd, yet it is perfectly right under this alley and taw system. The only wonder is that men of scientific training can soberly call these coitus genera, or that two Hubnerians can look each other in the face without laughter.

Second family, 5th coitus Symphædra, 4 species, 2 put to same, Hub., 1 put to Athalia Hub., and 1 to Aterica Bois. To make up Aterica species are taken from 1st family 1st coitus, 2nd family 5th coitus, 3rd family 1st coitus.

Third family 2nd coitus, 3 species, 1 to Callizona Doub., the 51st genus of Nymphalinae, 1 to Gynæcia Doub., the 52nd, and 1 to Nymphalis Latr., the 104th genus.

Fifth coitus, 3 species, 1 to Catonephele Hub., 40th genus Nymph., 1 to Euphaedra Hub., the 85th, 1 to Siderone Hub., the 111th genus.

Fourth family 2nd coitus, 2 species, 1 to Phyciodes Hub., the 14th genus Nymph., 1 to Villa Kirby, the 57th.

Fourth coitus, 3 species, 1 to Colænis Hub., the 1st genus Nymph., 2 to Victorina Blanch., the 64th.

Fifth family 1st coitus, 4 species, 1 to 1st genus Nymph., 1 to 58th, 1 to 81st, 1 to 82nd.

Second coitus Acca, 13 species, of which 7 go to Neptis Fab., the 81st of Nymph., 3 to 82nd, 1 to Eurytela Bois., the 30th, 1 to Phyciodes Hub., the 14th. So that we see Phyciodes picking species from

5th Stirps,	1st family,	1st coitus.
7th "	4th "	2nd "
" "	5th "	" "

And Eurytela from

6th Stirps,	1st family,	1st coitus.
7th "	5th "	2nd "

Eighth Stirps Potamides, 1st family 2nd coitus, 2 species, 1 to Doleschalla Felder., the 28th genus Nymph., 1 to Siderone, the 111th. And Siderone picks from

6th Stirps,	3rd family,	1st coitus.
7th "	" "	5th "
8th "	2nd "	2nd "

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And Morpho Fab. as it stands in Kirby picks from 3rd family 1st, 4th and 6th coitus, while between the 2nd and 4th comes Bia, one of the Satyrinae !

Ninth Stirps, Oreades, generally equivalent to what in Kirby is the 2nd sub-family of the Nymphalidae, the Satyrinae. 1st coitus Tenaris, 2 species, put under Tenaris Hub., which stands in the 4th sub-family of the Nymphalidae, the Morphinae.

Third family 1st coitus, Faunis, 2 species, 1 to Cleome West., among the Morphinae, the other to Taygetes Hub., the 57th genus of the Satyrinae. The very next coitus, Lethe, 1 species, put in Lethe Hub., the 7th genus of the Satyrinae. And the coitus immediately following is Hypna, 1 species, put as Hypna Hub., the 109th genus of the Nymphalinae !

Fourth family, 1st coitus Hipparchia, 7 species. 6 of which are put to Hipparchia Fab., the 32nd genus of Satyr., 1 to Calisto Hub., the 46th.

Third coitus Eumenis, 4 species, 2 to Hipparchia Fab., 2 to Oeneis Hub. The next coitus, Oeneis, has 5 species, 4 put to same and 1 to Hipparchia Fab.

This spurious genus, Oeneis Hub., thus made up by selecting from two coitus, each of which contains a mixed lot of Chionobas and Hipparchia, is quoted now-a-days as the equivalent of the well defined and natural genus Chionobas Boisduval, with a pretended precedence of some 30 years !

Hipparchia Fab. selects species from the 4th family, 1st, 2nd, 3rd, 4th coitus, and 5th family 7th coitus.

Ninth family, 1st coitus Callidula, 3 species, 1 doubtfully put to Pentila West., a genus of the Lycaeninae, 1 to Haematera Doub., the 48th genus of Nymphalinae, and 1 is a Heterocerous Moth. Scudder (Hist. Sketch) says that 2 of the 3 are Moths.

Second coitus, 3 species, 1 to Crenis Bois., 35th of Nymph., 1 to Callithea Bois., 56th of same, and 1 to Trichoris Hew., the 39th genus of the Lycaeninae. Now Oreades is claimed by the Hubnerians to be synonymous with Satyridae !

Under Maniola Schrank, Kirby lumps all the species of two families and eight coitus, except two species.

Second Tribe *gentiles*, 1st Stirps, Agrodiaeti. The 1st family has 11 coitus, every species except one under which is lumped in Kirby as Cupido Schrank, as are others in the next family and several coitus.

(To be Continued.)

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ON PLATYSAMIA COLUMBIA SMITH.

BY F. B. CAULFEILD, MONTREAL, P. Q.

(Concluded from April No.)

Taking into consideration the great difference in the lives and habits of the orders in question, I do not think the interbreeding of species of the genus *Tetreao* is any strong proof of the correctness of Dr. Hagen's conjecture. Robert Mudie, in his "Feathered Tribes of the British Islands," speaking of *Tetreao tetrix*, says: "During the latter part of autumn and winter the males live together in flocks and in a state of the most perfect harmony; but when the warmth of spring begins to be felt, and their plumage, which had become rather dull during the winter, begins to shine in all the beauty of its glosses, they separate from each other and fight stoutly for their females. They are then on the alert by early dawn, crowing and showing off the beauties of their plumage in a great variety of attitudes and gestures."

This, I think, is a great contrast to the life of the moth. The Grouse is gifted with the power of uttering cries or calls by which his presence is made known, not only to his own species, but to *every bird that is within hearing*. Of this the moth is entirely destitute; further, when the call of the male Grouse has attracted the female, he makes his desires known to her by various gestures and attitudes, and any person who has given a little attention to domestic fowls or to pigeons, must be aware that birds can convey a great deal of meaning by gesture. This power, too, is wanting in the moth. Now, supposing that the males of one species of *Tetreao* were absent, and the males of another were calling, the females of the first species would hear them and their natural instinct would, I think, teach them to go to a cry that must at least bear a family resemblance to that of their proper mates; once in sight of the male his animated gestures would convey his desires, and though they might not actually keep in his pack, yet from their social habits they would keep near them, and seeing the gestures of the male, would sometimes submit to him in the absence of their legitimate partners.

But with the moth it is very different; in this case the attracting power emanates from the female, and is silent and invisible. The moth utters no cry by which her presence would be made known to the males

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of other species, her attractive power, as shown I think by the experiments quoted, affecting the males of her own species only. Therefore I cannot see how the scarcity of any species of Atticii would be the means of producing hybrids; surely the absence of the males of one species would not increase the attractive powers of the female to such an extent as to affect the males of another species; if so, why did not the female *promethea* exposed by Mr. Bethune attract some of the male *cecropias* that came so freely to their own female.

There is another point to be considered in this comparison of birds and moths. During the breeding season a pack of Grouse consists of one male and several females, therefore if half of the pack were killed by hunting, the male would in all probability be amongst them. But in the moths the sexes are, I believe, nearly equal, and even if a species was extensively damaged by parasites, we have no reason for thinking that both sexes would not be represented by the few that escaped the attacks of their enemies, in which case there would be no need of their recurring to another species.

Dr. Hagen says that in the year that *columbia* was taken in Maine, the Atticii were extensively attacked by parasites in that neighborhood. In this locality (Montreal) in 1874, the year that Mr. Pearson found *columbia*, the Atticii were remarkably free from parasites; I do not think there was more than one in eight affected. Mr. Pearson fonnd five cocoons of *promethea* (it is always rare here), four of which produced the moth; the other was dead in the chrysalis, but had not been attacked by parasites. Mr. Pearson also found twelve cocoons of *cecropia* on one tree, all of which produced the moth, and from a large number of cocoons of *cecropia* and *polyphemus*, taken in various places around Montreal, the number affected by parasites was comparatively small.

I suppose the reason that *cecropia* and *promethea* are selected as the parents of *columbia* is that the dark color of the latter bears a slight resemblance to the smoky color of the *male promethea*, but how is it that there is no trace of the falcate primaries of that insect in *either sex* of *columbia*, and how is it that in *columbia* there is no trace of the very remarkable manner in which the cocoon of *promethea* is attached to its food plant?

Dr. Hagen mentions several instances of hybrids having occurred amongst the Atticii while in confinement. I do not think much importance should be attached to this circumstance, as the interbreeding of

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insects while in confinement is no proof that they will do so under natural conditions. Doubtless many of the Atticii will interbreed if shut up together, but from the stay-at-home habits of the females, I think they are about the least likely of all Lepidoptera to do so while in a state of nature.

But leaving theories and conjectures, let us see what evidence known facts will give us in favor of *columbia* being a good species. In (I believe) 1862 or 1863, Prof. S. J. Smith found a number of cocoons of *columbia*, three of which produced the moth. In August, 1864, Mr. G. J. Bowles found at Quebec a larva which in due time spun its cocoon. This cocoon was at first of a whitish color, but turned to a dark brown, and was then similar to the other cocoons of *columbia*. Mr. Bowles tells us that the moth died in the chrysalis state, owing perhaps to the presence of parasites. In speaking of this larva, Mr. Bowles says: "The principal difference (as far as I can remember), was in the number of red warts with which the larva was ornamented, *columbia* possessing *more* than the other species" *(cecropia)*. Dr. Hagen examined the dried larva skin of *columbia* (taken in Maine), and found the number of warts to be the same as *cecropia*, but the difference pointed out by Mr. Bowles was not in the *total number* of warts, but in the number of *red* ones, that is, the larva of *columbia* had more *red* warts than the larva of *cecropia* has.

In 1866, Mr. Bowles found another cocoon attached to a twig of thorn, but it was full of parasites, dead in the pupa. In the fall of 1867, Mr. Wm. Couper informed Mr. Bowles that he had seen a Saturnian larva spinning up on a gate-post. Mr. Bowles found this cocoon, which in the following May produced a female *columbia*.

In the winter of 1874, the Messrs. Pearson found a cocoon on a maple tree, in this city (Montreal), which next season produced a male *columbia*.

In Norway and Maine I belive both *cecropia* and *promethea* occur; certainly both these species occur in this locality (Montreal), but neither *cecropia* nor *promethea* have been recorded from Quebec. Now, Messrs. Couper and Bowles collected for a number of years at Quebec, but never met with either of these species; surely it is hardly possible that two experienced collectors would find a hybrid in the same locality, and neither of them find the species that produced it. Nor is it likely that a hybrid would occur in the same locality in such closely succeeding years as *columbia* did at Quebec, in 1864, 1866 and 1867. This, I think, is very

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strong evidence, indeed, and weighing carefully all the facts of the case, the appearance of the moth and its cocoon, and the habits and instincts of the order and family to which it belongs, we are, I think, until further and more direct evidence to the contrary is produced, fully justified in considering *columbia* to be a distinct species.

NEW PYRALIDS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Botis sexmaculalis, n. s.

♂ ♀. This species in ornamentation approaches *partialis* Led., Taf. 9, fig. 8. Both wings clear pale lemon yellow. Primaries crossed by four equidistant lines, of which the first three from the base form brown spots narrowly outlined in black on the costal region. The third spot coalesces with an inferior spot on the line. The second line widens into a small spot on internal margin. The fourth line has a small dark spot on costa and one on internal margin. The apical half of the fringes are dark brown. The secondaries show a distinct discal point, another at anal angle and another at the extremity of vein 2, the most prominent of a line of minute terminal marks. Head and thorax yellow, collar brown; abdomen yellowish; legs yellow, spotted with dark. No. 239, Prof. F. H. Snow, Lawrence, Kansas; Expanse 18 to 20 mil.

Botis penitalis, n. s.

♂ ♀. This species in size approaches *crinitalis* Led., Taf. 12, fig. 2. The color is a yellowish ferruginous, more or less bright. Subterminal line indicated by a darker shading. Outer line dentate, slightly inflected on vein 2, linear, distinct and tolerably regular. Discal spots undefined, darker shaded marks, the orbicular small. Interior line upright, thrice waved. Secondaries pale or stramineous, pellucid, slightly ferruginous stained along external margin, with pale fringes and a faint transverse line visible medially. Beneath yellowish, the outer line visible distinctly on

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primaries, and the subterminal showing as a dark discontinued shade band. The dentate line on secondaries continuous. Expanse 29 mil. No. 285, Lawrence, Kansas, Prof. Snow. "Common; feeds upon the "receptacle" of the Western Water-lily *(Nelubium luteum)*."

Botis erectalis, n. s.

♀. This species resembles the preceding, but is a little larger. The color is a dusty wood brown. The exterior line has the dentations rounded at their points and the line itself differs by being less erect, more outwardly produced opposite the cell and followed by a narrow pale shading. It runs more inwardly at external margin and seems to be without the sinus on vein 2. The stigmata are small, dark, solid, less diffuse and more distinct than in *penitalis*. The hind wings are pale, dusted with fuscous with a median line visible centrally, a narrow terminal line and the terminal space more distinctly fuscous; beneath with a distinct discal mark. Fore wings fuscous, showing the markings of upper surface, the small reniform lunule and orbicular dot, evident. Expanse 34 mil. Albany, Prof. Lintner, No. 1,310.

Botis communis, n. s.

♂ ♀. This small species appears to be allied to the group of *ventralis*, but the venter is not discolorous. It varies from fuscous to orange yellow. Outer line finely denticulate, followed by a paler shade, upright, indented submedially thence perpendicularly to internal margin. Stigmata dark, small, solid, distinct. Hind wings pellucid; beneath paler than above. The secondaries vary to fuscous; the median line sometimes noticeable, beneath it can be made out as well as a discal spot. Expands 20 mil. New York (E. L. Graef, No. 144) to Alabama (Grote).

ON COPIDRYAS GLOVERI *(G. & R.)*

BY A. R. GROTE, BUFFALO, N. Y.

My kind correspondent, Mr. O. Meske, of Albany, sends me a male specimen presumably belonging to this species, which we referred originally to the Cuban genus *Euscirrhopterus* Grote, and (from a female)

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considered congeneric with *E. Poeyi* Grote. The specimen now sent has an undivided frenulum and is unquestionably a male. It does not show, however, the aberrant wing structure of *Euscirrhopterus*. It might be referred to *Eudryas* but for the peculiar frontal structure. Instead of a tubercle, a wide plate extends forwards from the clypeus, with a lip-shaped outer margin, which is peculiar. I therefore make it the type of the genus *Copidryas*. The thorax is hairy, grayish black; two white lines run from the palpal tips above the eyes to the base of the head. The ordinary lines are expressed by metallic scales, and the black edged sub-equal stigmata are filled with similar scales. The female type of the species is not accessible to me and its description varies, as above noted, from my present male. It was, I recollect, not in very good condition; and it has been figured by Glover (Plate 85, fig. 34). From this figure my male differs by the absence of the shallow white median sinus, and white internal annuli to the stigmata, as well as by the narrow black band on the hind wings (even on its inner edge), and less brownish, more grayish black primaries; the orbicular is also more elongate. The yellow abdomen is black at anus and tufted with black scales at base. There is besides a mesial line of black scales on the dorsum. The eyes are naked. On the whole, I am inclined to consider this form as the ♂ of *C. Gloveri;* more material of both sexes and a comparison with the type are needed to make the matter certain. It is not unreasonable to expect some sexual differences, in coloring at least, in this group.

LARVÆ OF THYREUS ABBOTII.—In response to Mr. Whitney's article with regard to the supposed sexual distinction in color of the larvæ of this species (CAN. ENT., 8, 75), I can confirm it from my observations made in breeding larvæ of both colors in Brooklyn, L. I. I have never regarded the color as a sexual character and in my Sphingidæ of Cuba (Proc. Ent. Soc. Phil., 1865) I state distinctly that "the larvæ of *Thyreus Abbotii* and certain species of the genus *Philampelus* Harris, possess a tint of brown or green *indifferently* at maturity." I give the same fact with regard to *Eacles*. I regret that I cannot now refer more particularly to observations which were fresh in my mind when I made the above quoted statement.—A. R. GROTE.

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NOTES ON THE VARIATION IN COLOR OF ŒDIPODA CORALLIPES AND ŒDIPODA CINCTA.

BY G. M. DODGE, GLENCOE, DODGE CO., NEBRASKA.

Rev. Cyrus Thomas, in his Acrididæ of North America, page 132, says: "There are no permanent characters by which to distinguish alcoholic specimens of *Œdipoda corallipes*, *Haldemanii*, *paradoxa* and *rugosa* from each other." He therefore considers them the same. Probably *Œ. discoidea* might be considered as another variety of the same. This much named grasshopper is abundant in Nebraska from the middle of June to about the middle of August. Owing to its large size (which is exceeded here only by the huge, wingless *B. magnus*) and colored wings it is one of the most conspicuous of our Orthoptera. It would be difficult, if not impossible, to breed grasshoppers from the egg; the only way, therefore, to establish the relationship of different varieties, is by comparing a large number of fresh specimens, seconded by close observation of their habits. I have therefore collected and compared a large number of specimens of this species during the past summer. I find but little difference between them except in the color of the wings and hind femora and tibiæ; but these vary considerably, as the following table will show:

Variety A. Wings yellow; inside of hind femora and hind tibiae yellow.
" B. Wings red; inside of hind femora and hind tibiae yellow (*Œ. paradoxa*).
" C. Wings yellow; inside of hind femora and hind tibiae bright red (*Œ. Haldemanii*).
" D. Wings red; inside of hind femora and hind tibiae bright red.
" E. Wings yellow; inside of hind femora whitish, ribs brown; hind tibiae yellow.
" F. Wings yellow; inside of hind femora brown, lower sulcus blue; hind tibiae yellow.

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Variety G. Wings red; inside of hind femora brown, lower sulcus green; hind tibiae yellowish red.

" H. Wings red; inside of hind femora greenish blue; hind tibiae yellow *(Œ. discoidea)*.

Variety "D" I have frequently seen mated, but never with any other variety. This, then, may prove a distinct species, which point another season's observation may determine. The other varieties mate indiscriminately and assume the imago form at the same time. Probably a close search would reveal other varieties not enumerated above.

A similar instance of variation in color is afforded by another Nebraska species, viz., *Œdipoda cincta* Thos.

This species appeared sparingly last August. Its season was of short duration. It is of medium size and has spotted elytra similar to *Œ. corallipes*. In Mr. Thomas' description of the ♀ the wings are said to be "transparent, base greenish yellow, a narrow fuliginous band across the middle, apex pellucid with a few fuscous dots." This description applies very well to perhaps half the ♀ specimens obtained here; although the band can hardly be called "narrow" as compared with our other *Œdipodas*. But specimens with the base of the wings *red* were quite as frequently seen, both males and females. The two varieties appeared at the same time, were found in company and disappeared together. Other than the color of the wings, there is no perceptible difference between them. The ♂, not described by Mr. Thomas, is smaller and darker than the ♀. It has several large fuscous spots at tip of wings; the inside of hind femora and hind tibiae are of a more brilliant blue, and the whole upper side of the abdomen has, in life, the same beautiful color.

The species, as taken here, differs in several particulars from Mr. Thomas' description of *cincta*, but is said by that gentleman to be identical.

The red winged var. may therefore be known as *Œdipoda cincta* var. *umbrator*. The measurements of both varieties are as follows:

Female—Length, 1.25 inches; elytra, 1.20 inches; hind femora, .65 in.
Male—Length, .95 inches; elytra, .90 inches; hind femora, .55 inches.

From the above notes it will be seen that color can not always be depended upon as a specific character in our Œdipodini. Undoubtedly the present number of supposed species could be greatly reduced by careful comparisons instituted on the field of collection.

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TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

ADELA.

A. (Nematais ?) trifasciella, ♂. *N. sp.*

Eyes large and close together on the vertex. Palpi, base of tongue and large basal joint of the antennæ, head and upper surface of the thorax, clothed with long blackish hairs, darker than the fore wings are, except at their base. The antennæ are more than twice the length of the wings and silvery white, the basal third dotted above with blackish. Wings and legs rich dark brown, changing with the light to green, blue, violet, bronze and golden. At about the basal fourth of the fore wings is a narrow white fascia, about or just behind the middle is another slightly angulated posteriorly; these two fasciæ are a little nearer together on the costal than on the dorsal margin, the first one being a little oblique, and before the apex is another costal streak perpendicular to the margin, and nearly opposite, but a little behind it, is a small dorsal white streak. Probably these two streaks are sometimes united; and the first two fasciæ are much less distinct in the middle than on the margins, and are possibly sometimes interrupted. The tarsi are grayish fuscous, annulate with white at the joints. *Al. ex.* ½ inch. Received from Mr. James Behrens, of San Francisco, California.

A. fasciella, ♀. *N. sp.*

The white streaks and fasciæ on the wings resemble those of the preceding species, except that they are wider and more distinct. The middle one is not angulated, the first one *appears* to be a dorsal streak not crossing the wing, but this appearance may be the effect of slight denudation of the base of the dorsal margin; and the third streak stops abruptly close to the dorsal margin, is not interrupted and is not nearer to the apex on the dorsal than on the costal margin. All this, however, is within the ordinary range of variation within the limits of a species, and this *may* be the female of the preceding species. But the head and appendages are clothed with saffron hairs, instead of blackish, and the hairs are shorter. The antennæ are broken off, except the basal half of one, which has alternate black and white joints at the base, becoming black simply flecked

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with white further on; the basal joint is not swollen and the stalk is simple; the color of the thorax and fore wings is as in the preceding species, but the reflections are more green and blue; the hind wings are dark fuscous, *with a small white spot* about midway of the dorsal margin. The abdomen is narrow and pointed and of a rich brown hue. *Al. ex.* ½ inch. Mr. Behrens, San Francisco.

A. flammeusella, ♀. *N. sp.*

A single specimen with both antennæ broken off near the base. The basal joint of the antennæ is not incisorate, and my notes made when the specimen was received say that the antennæ are black annulate with white. The palpi also are gone. The head is clothed with saffron yellow hairs as in the preceding species, and the body, the basal joints of the legs and the fore wings are rich greenish brown, varying with the light to purple, bronzy green or golden; by gas light it appears bright golden and with the wings closed looks like a minute brilliant flame, whence the specific name. The fore wings have no markings except a minute whitish spot at the beginning of the costal ciliæ, which is also visible on the under side of the wing. It is a little smaller than either of the two preceding species, and like them was received from Mr. Behrens.

SEMELE.

S. argentinotella. N. sp.

Face and palpi pale stramineous, except the outer surface of the second joint of the palpi, which is black. Vertex, upper surface of the thorax and base of the wings of a rich black, the black of the base of the wings passing back along the fold and about the middle of the wing length, spreading gradually over the entire wing, but becoming more brownish and strongly bronzed. The costal and dorsal parts of the wing, where the black is confined mainly to the fold, are suffused with silvery white on a brown ground, which it almost obscures, and the white scales pass backwards into the bronzed brown parts of the wing behind the middle; and there is also a patch of suffused white at the base of the dorsal ciliae before the apex; the bronzed brown becomes deeper from the middle of the wing length backwards, and the apex is nearly black. There are two silvery spots at the end of the cell and six silvery costal streaks, or more properly, seven, but the first is on the extreme costa and seems to form part of the suffused white of that part of the wing; the

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next is short and very oblique, and a little before the middle; and each of the succeeding five is a little less oblique and a little larger, the last pointing obliquely forwards; there is a streak at the apex (or exceedingly close to it on the dorsal margin), and there are six dorsal silvery streaks, the first five pointing a little obliquely backwards, and the sixth opposite and perpendicular to the last costal streak. The first and second dorsal streaks are opposite, respectively, to the spaces between the second and third, and third and fourth costal streaks (counting seven costal streaks in all); the third and fourth dorsal streaks are closer together, and are both opposite the space between the fourth and fifth costal streaks, and the fifth dorsal is opposite the end of the fifth costal. The dorsal ciliae are whitish with two dark brown hinder marginal lines behind the tip of the wing, the first about the middle and the other near the end of the ciliae. All of the silvery streaks are very smooth and a little raised. The antennae are black except at the base beneath and the apical fifth of their length, which are creamy white. Hind wings and abdomen (except its under surface) purplish fuscous; under surface and anal tuft creamy white. The basal joints of the legs are also yellowish white; but the tibiae and tarsi are black on their anterior surfaces, and annulate with creamy white. *Al. ex.* ½ inch. Kentucky in June.

S. argentistrigella.

Tinea argentistrigella, ante v. 5, p. 89.

This species structurally and in ornamentation resembles the one above described. The head is not roughened as in *Tinea*, the long scales of the vertex project forwards rather than upwards and those of the face project upwards to meet them. I have not examined the neuration of *S. bifasciella*, but that species differs from these two by having distinct tufts on the wings and the maxillary palpi folded more like those of *Tinea*. The labial palpi of these three species and the clothing of the head, form and size of the antennæ and probably the neuration of the wings are alike, and they are nearer my genus *Pityo* than to *Tinea*.

TINEA.

T. imitatorella. N. sp.

At page 85, vol. 5 of the CAN. ENT., I have described a species as *T. cæmitariella* (there misprinted *cunitariella*). It is not necessary to describe this species *(imitatorella)* otherwise than by a reference to the

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description there given. It is proper to say, however, that the palpi and legs should rather be described as silvery gray, or as gray, with blackish markings on the legs, rather than as silvery white stained with fuscous. Captured specimens of *imitatorella* were for a long time placed among *cæmitariella*, though a close examination would have shown the difference. I did not, however, observe the difference until I bred from a new larval case a species which I recognized at first as *T. cæmitariella.* On examination of the specimen and comparison with bred specimens of *cæmitariella*—a single specimen of each -a difference was found in the costal and dorsal streaks on the wings, but an examination of other specimens showed that this could not be relied on, as both species vary greatly in this respect, as these markings vary from lines which cross the wings to mere dots on the margin. The legs of *imitatorella* are more decidedly black than in the other species, but the only important difference in the imago is in the antennæ. The antennæ of *cæmitariella* are robust and yellow banded above with fuscous lines, while those of *imitatorella* are quite slender and in color shining black. There is also a decided difference in the larval cases ; that of *cæmitariella* is much depressed, narrowing before each end, that is, scalloped on each side before each end, the under side truncated at each end and the upper projecting like the bowl of a spoon beyond it ; the case of *imitatorella* is scarcely at all depressed, it is not scalloped as in *cæmitariella*, the upper side does not project beyond the lower, and the anterior end is narrower than the posterior one.

T. croceoverticella. N. sp.

Dark brown, in some lights strongly bronzed ; head saffron colored ; antennæ dark brown ; palpi a little paler than the head ; under surface silvery whitish faintly tinged with golden yellow ; wings rather wide ; ciliae grayish, with two brown hinder marginal lines, one at their base and the other beyond their middle. *Al. ex.* a little over ¼ inch. Kentucky.

T. thoracestrigella. N. sp.

Much like the above, but larger, having an *al. ex.* of more than ⅜ of an inch. The fore wings are simply dark brown, without bronzy reflections ; and so are the ciliae, which show no hinder marginal line ; the hind wings also are brown, though paler than the fore wings. The head is more reddish saffron, and a line of that color extends from the head to the tip of the thorax. Otherwise it resembles the species above described.

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ON HOMOPTERA AND ALLIED FORMS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

The species of *Homoptera* stand in need of a revision. They are usually but partially and confusedly named in such collections as I have had access to. With regard to the generic title, its acceptance is only provisional. Two species, *Phaeocyma lunifera* Hübn. and *Phaeocyma fluctuaris* Hübn., are unknown to me. The descriptions hitherto published in this genus are difficult to use for identification ; no comparative characters are given, no analysis of the lines entered upon. The characters separating *Zale* and *Ypsia* are in great part unexplained, and of the latter dependant on larval characters. *Obliqua, duplicata* and *benesignata* are allied, the two first perhaps synonymous ; *nigricans* is unknown to me ; probably no one has yet correctly identified *calycanthata* of Abbot & Smith. Walker's and Bethune's "*calycanthata*" is *Zale horrida* Hübn. Guenee's *calycanthata* I think I have identified. *Minerea* I think I know. Walker's *herminioides* is *Epizeuxis aemula !* Leaving Walker's names out of the question, we have *lunata, edusa* and *Saundersii* generally fixed in collections ; besides this, I have *calycanthata* Guen. and *albofasciata* Beth. determined. *Atritincta* and *edusina* are small dark forms from Texas. The present paper calls attention to the want of information and is written in the hope that material will come in so that the species may be worked over. It is necessary in studying the species to observe the course of the thread-like transverse posterior (t. p.) line. In *lunata* it is waved ; in its course superiorly, opposite the cell, it will be seen to be dentate in addition to the usual central indentation. It is also dentate in *Saundersii* and *edusa*. *Rosæ* Behr., from California, from a single specimen, does not seem to me distinct from *lunata*. Drury's fig. (pl. 20) is hardly well enough drawn to decide, but the t. p. line appears to be given as somewhat jagged, so I do not venture to alter our usual determination of his species, which is our dark brown and stouter form. Another species, which I propose to consider as *minerea*, is similar to *lunata*, but differs by this line, frequently obliterate, being nearly even except the discal notch ; it is a little waved inferiorly, but is not dentate superiorly. *Minerea* is of

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the same facies and color as *lunata*, and is not to be confounded with more grayish or blackish forms which have this line distinct and even. It has the same subterminal dark shades as *lunata*, and the discal lunule (reniform) black and large. From time to time I have suspected in it *minerea*, and smaller specimens as *lunifera*, but it can not be the latter. It is very common in Canada and often goes under the name *lunata*. In pale specimens the median space and terminal, above the inferior black shade, are concolorous, yellow brown, and the dark markings contrast. The subterminal black lunate shade is diffuse and broader than in *lunata*. Beneath the hollow reniform is more evident than in *lunata*; I do not think there is a character in the lines of the under surface; in 10 *lunata* (Texas to Canada) these are variable. On the submedian space the t. p. line shows a slight notch or dot or thickening in *lunata*, wanting in *minerea*. *Minerea* is thinner bodied, and, perhaps, less compact and slighter winged than *lunata*. Else the two are nearly alike.

Saundersii is very like *lunata*, but has narrow whitish shades following the t. a. and subterminal lines; also on costa after the t. p. line. *Calycanthata* Guen. differs from *edusa* in the evenness of the t. p. line and richer color. *Albofasciata* differs by having a narrow white filling beyond the s. t. line. The two following forms seem to be undescribed.

Homoptera unilineata, n. s.

♂. This species is of the size of *Zale horrida*. It is totally pale brown, with all the lines indistinct except the subterminal. The wings are crossed by nebulous striæ of a darker hue. The orbicular is a black point. Reniform not legible on either surface. Subterminal line *continuous, even*, medially produced, geminate, its outer line bright ochre brown, space between its component lines pale. Terminal space faintly hoary, more distinctly striate. Hind wings concolorous with subterminal line alone distinct, *black*, obliterate on costal region. Wings dentate; fringes concolorous. Beneath without stigmata, paler, unicolorous, brown. Body parts concolorous. *Expanse* 43 mil. Canada, Mr. Saunders.

This cannot be *uniformis*, CAN. ENT., 7, 148, because that species is said to have "the subterminal line only seen as a black diffuse shade crossing the wings." This line is linear and very distinct in *unilineata*, and it is brown, its outer line bright ochre, on primaries. In *Zale horrida* there is a rounded discal sinus to the s. t. line, wanting in *unilineata*.

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Ypsia umbripennis, n. s.

♀. Size and markings of *undularis;* black with the median space of primaries inferiorly and base of secondaries brownish. At once distinguished from *undularis* by two white linear shades accompanying the t. p. line and before it, from disc to internal margin. The lines and outline of the reniform velvety black. Subterminal line marked with whitish opposite the cell. Hind wings with the white linear shades from the cell to internal margin. Beneath dark brown with empty reniform and transverse lines. Head and thorax black. *Expanse* 43 mil. Grimsby, Mr. Pettit; London, Mr. Saunders.

Very much like *undularis*, but noticeably different by the white lines on both wings. This may be Walker's variety of "*squamularis*"; if so he has not unlikely transposed *coricias* and *undularis.*

NOTES ON LITODONTA, WITH REMARKS ON ONCOCNEMIS.

BY LEON F. HARVEY, A. M., M. D., BUFFALO, N. Y.

In a collection sent by Mr. Belfrage from Bosque Co., Texas, are 15 generally fresh specimens of this genus which I have carefully examined. The type of *hydromeli* ♂ is numbered 527 (violet label), the ♀ 246 (red label). The orange dots following the fuscous blotches of the subterminal line are less evident in the male, and at the base of the wing the orange powdering is less prominent. I am inclined to consider seven specimens, two males, five females, captured from May 3rd to May 21st, as typical.

The variation is in the extent of the orange shadings. The abdomen of the male is a trifle longer, and the hind wings more purely whitish. The antennæ in both sexes are feathered, the tips being simple; in the males the pectinations are a little longer. The hind wings of one female are almost blackish, save the bases, and there is but the slightest trace of orange on fore wings; another is very small, measuring but 26 m. m., the

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orange observable only behind the s. t. line. These specimens are numbered 246, 247, 527, 528, 529, two unnumbered. There can hardly be a specific value due to the presence of the orange scales. Throughout the same characters of ornamentation prevail. With other six males no orange is apparent; the green approaches a bluish tinge, with possibly a clearer ground to the wing. Of these three were taken in May, two in August, and one in November. I cannot regard them as differing from *hydromeli;* there are a very few orange scales behind the more isolated spot of the s. t. line, between the second and third nervule, in the November ♂. At the present writing I do not feel justified in expressing the difference by a name. Two of these are numbered 248 and 531. Two other males are different in the total absence of all green color, the prevailing colors being white and blackish. The 10th and 11th of August are the dates of their capture, and they are numbered 530. It may be well to note this difference, whether it be specific or not, expressing it by the name *fusca.* This name is based on perfectly fresh specimens, not faded ones, originally, perhaps, green. There is the slightest possible trace of a warm tint behind the s. t. line. On the costa of the hind wings there is a little shading, the usual faint pale band being apparent. In these two examples there is no essential difference other than noted from the rest of the specimens. As is usual, the t. a. line is denticulate on the costa, then waved and geminate, the white costal filling being present in a marked degree, as well as the white filling to the sub-basal line. From a casual glance at these insects and from the numbers of Mr. Belfrage, I was led to expect two or three species. Now I have to record only one, yet *fusca* may hereafter lay claim to specific value.

Lederer, in writing of the genus *Oncocnemis*, says that the species are found in the Ural and Altai Mountains, and we have no information of any other European locality. Mr. Grote first discovered it in this country, as found in Colorado, thus stamping it more thoroughly, as he thought, as a mountainous insect. But lately it has been captured in three widely different localities. *O. riparia* Morrison = *Chandleri* Grote, found on Staten Island, N. Y., by Mr. Fred. Tepper; *O. Chandleri*, found in Erie Co., N. Y., by Miss Mary E. Walker; *O. augustus* Harvey, collected by Mr. Belfrage in Bosque Co., Texas. Mr. Grote has just described another species, *O. Saundersiana*, Grimsby, Canada (Mr. Pettit). We have here a very wide range, showing conclusively that its habitat is of the low as well as the high lands, of the south as of the north.

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NEW MOTHS.

BY A. R. GROTE, BUFFALO, N. Y.

Botis submedialis, n. s,

Allied to *marculenta* G. & R. Stouter, of a duskier yellow. Distinguished by the open, fuscous-ringed discal spots and by the presence of a similar spot on the median space inferiorly, below the median vein. These ringed spots are inconspicuous. The subterminal line of *marculenta* is obsolete. Secondaries with a broader angulated median fuscous facia; the subterminal again wanting. Beneath fuscous, with the outer transverse line on the fore wings picked out by interspaceal pale blotches.

Expanse 27 mil. Hab. Canada (Mr. Saunders).

Hydrocampa ekthlipsis, n. s.

Size of *genuinalis* Led., with the wings more pointed and the external margin more sinuate. Dusky yellow with white spots margined by black lines. Two of these spots superposed on median space, the lower the larger, pyramidal. A large white spot open to costa at outer third, its outer edge rounded; in *genuinalis* this spot has its outer edge alone distinct and concave. A fine brown line, submedially angulate, follows this outer spot on the yellow ground color of the wing. Then a subterminal whitish shade band is bordered inwardly by a diffuse dentate brown line, and outwardly by an even dark line; terminal space even, yellow. This ornamentation is repeated on hind wings where the median spots are confluent. Beneath as above.

Expanse 22 mil. Albany (O. Meske); London (Mr. Saunders).

Eurymene rosaria G. & R. MS.

Entirely pale yellow with the transverse lines appearing as diffuse darker bands, the outer stained with blackish and pink at internal margin. External margin of fore wings rounded. Costa at base flushed with pink. Hind wings with an olive-colored curved abbreviated band at internal angle, outwardly diffusely pink. Beneath more brightly yellow, unicolorous, with the secondaries pink beyond the flexed outer line. No discal marks. Abdomen beneath and fore femora pink. This species has been distributed under the above MS. name, but not as yet described.

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It is said to feed on Willow (Saunders). It is a well-sized species with indeterminate lines and no discal spots. The female expands 38 mil.

Eurymene Kuetzingi Grote.

A description and the type of this purple-black species have been sent to Prof. Packard for publication in his expected monograph of the Geometræ. It is named for Mr. Kuetzing, of Montreal, who found the species.

Sisyrosea, n. g.

The type of this genus is the *Limacodes inornatus* of Grote and Robinson. *Sisyrosea inornata* has the male antennæ bipectinate, with converging setose branches, throughout their length. The palpi are prominent, the body thickly scaled. The moths are of the size of the species of *Euclea* as defined by Packard. The color recalls the sack-bearing species of *Perophora*. *S. inornata* is immaculate, without lines (Am. N. Y. Lyc. N. Hist., 8, 1866).

Sisyrosea Nasoni, n. s.

♂ ♀. This species is of a pale brownish color, like its congener, sparsely sprinkled with black. An oblique dark brown line crosses the fore wings from apical third of costal to basal third of internal margin. A second subterminal dark brown line crosses the wing straightly. Both lines are faintly pale bordered outwardly. The thorax is slightly brighter, reddish tinged. *Expanse* 1 inch to 1¼.

Collected by Dr. William A. Nason, after whom the species is named, in Virginia.

CANADIAN INSECTS AT THE CENTENNIAL.—It will please our friends to know that the collection of insects sent from the Entomological Society of Ontario to the Centennial Exposition in Philadelphia, arrived there in excellent order. Visitors will find it displayed in the Canadian department in the Agricultural Hall. There are eighty-six cases in all, arranged in a double row on a suitable stand, which is over seventy-six feet in length. We think the collection does great credit to the energy and industry of our members.

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NOTES ON ENTOMOLOGICAL NOMENCLATURE.

Part II.

BY W. H. EDWARDS.

(Concluded).

In coitus 26 are 4 species, 3 of which are put in Myrina Fab., one of the genera of the Lycaeninæ, and 1 in Euselasia Hüb., of the Lemoniinæ. But the coitus Euselasia is in the other Tribe, and third Stirps of same, the Napaeæ!

Second Stirps Archontes (Papilio, etc.), 1st family Heroici, 2nd coitus Jasonides, under which stand Machaon and Turnus. Third coitus Euphœades, under which stand Glaucus (black female of Turnus), Troilus and Asterias. That is, according to the Hübnerian view, Turnus is nearer to Machaon than to its own female, and Glaucus is nearer to Asterias than to its own male! In Scudder's Revision he puts Asterias in the genus Amaryssus Dalman, and Glaucus into Euphœades Hübner, bringing Turnus out of Jasonides to join his mate, and puts Troilus into a new genus, calling it Pterourus Scopoli, 1,777. But in the Hist. Sketch he sees fit to condemn Scopoli's Pterourus with ignominy, in spite of the inexorable, on account of "the incongruity of the materials of which the genus is composed." However Scopoli's group only contained Papilios, Theclas, Hesperians and heterocerous moths, and why it should be so treated when Hübner's amazing coitus are called generic and made much of, is not clear to the average mind.* But as it would not do to leave Troilus outside because of Scopoli's bad taste, Mr. Scudder felt compelled to utilize Jasonides, and into it is now thrust Glaucus, with which the *ghost* of Hübner may well feel disgusted. After he had gotten his little

* I have taken some pains to compare the coitus names with the generic names given in the Hist. Sketch, to see if any had been rejected on account of the "incongruity of the materials," but in no case do I discover that this has happened. In Callidula, where the Sketch says the coitus is made up of one butterfly and two moths, the author merely suggests that the "genus may be referred to the heterocerous lepidoptera." Had there been two butterflies and one moth, he would have referred it to the butterflies.

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black heap so carefully together, for a stranger to pick out one and toss it over to the yellows, shows a degree of irreverence for Hübner's arrangement that is disturbing. So it happens, that in the various works of Mr. Scudder, Troilus has gone by three different generic titles within five years, namely, Papilio Troilus, Pterourus Troilus and Euphœades Troilus! Now all this trouble could have been avoided had the genus been called Pterourus Scudder, as it really was. Scopoli had no more to do with Scudder's genus Pterourus than had Julius Cæsar.

All the first 18 coitus of the first 2 families of the Archontes are put by Kirby in Papilio Linn., he paying no heed to the Verzeichniss divisions of this genus. The 4th coitus, 1st family, contains 6 species, of which our Cresphontes is one. Another is Pelaus Fab, which is given in the Verz. as a synonym of Torquatus Cram., and looking up the latter in Kirby, it stands as male of a distinct species whose female is Caudius Hübner, which in the Verzeichniss is in the 2nd family Priamides, separated by one family and nine coitus from its mate!

In 5th coitus stands Pammon Linn. Its variety Mutius is in the 6th as are also its females, Theseus and Romulus.

In the 2nd family, Echemon Hübner is male, and is in the 1st coitus, while its female, Echelus, is in the 2nd coitus. So in 1st is Tellus, which is the female of Sesostris, in 2nd. And Marcius in 1st is female of Aeneas in 2nd. And Anchises Linn. in 1st is a synonym of Lysander Cramer, which is in the 2nd.

In the 6th coitus are two species only, one of which stands in Kirby No. 19 on the list of Papilios, the other No. 91. And all through these two families the species skip about in Kirby from one part of Papilio to another, two adjoining species in one coitus being often separated by species which go to form parts of several other coitus in the Verzeichniss. Thus, between Anchises Cramer and the next species, Echemon, of the Verz., stand seven species in Kirby, all of which are enumerated by Hübner, and are scattered over 2 families and 3 coitus. So between Ulysses Linn. and the next in same coitus, Philenor Fab., stand in Kirby 23 of Hübner's species, from 2 families and 9 coitus.

What better illustration could be given of the true nature of this unnatural system than is displayed in these Papilios, the coitus based on no tangible character, the species raked together in heaps according to color or size of wing; males parted from their mates, varieties from the parent species, one dimorphic form from its fellow; congeneric species in

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different parts of the field and even over the fence in the next one, while the most distantly related species of the genus lie side by side. Is it possible that such assemblages deserve to be treated as genera !

Mr. Scudder bears hard upon Herr Koch, because he divided the Papilios according to the presence or absence of tails, as *caudati*, *ecaudati*, etc., and calls it "an extraordinary case of the survival of the spirit of mediæval science; would not have been excusable, scarcely tolerable, if it had been proposed in the middle of the last century; it is astonishing that it was allowed to appear in the respectable journal of Stettin, and of course they must drop," etc. (Hist. Sketch). But really I do not see why Koch should be thus flouted for dividing the Papilios in 1860 by their tails, when in 1875 Jasonides is pronounced by Mr. Scudder himself a satisfactory genus, "the hind wings tolerably long and tolerably short tailed." Or Heraclides, "the hind wings tolerably short and broad tailed." Why not the same sauce for both sexes of the goose !

Third Stirps Andropoda, 2nd family, 3rd coitus Zerene, thus defined: "Wings bright yellow, black margined, red fringed," and here stand the yellow species of Colias, namely, Palaeno, Caesonia, etc. In the 4th coitus, Colotides, come the orange species of Colias, Edusa, Eurytheme, etc., and it is defined, "wings above reddish-yellow with reflections, black margined." No more unreasonable than hundreds of other coitus, and showing very clearly that a coitus is a group of less value than a genus, in some cases. In others they are greater than a genus, as I have said; and if any of them are co-extensive with a genus, it is plainly by the merest chance. I would note here that Colotides would certainly have embraced the N. Am. Colias Eurydice, which is congeneric with Caesonia, but reddish, while the latter is yellow. And the female of Eurydice would as certainly have gone in a different coitus, had Hübner known of it.*

In this Stirps, Pieris Schrank picks species from 1st family, 1st, 2nd, and 8th to 12th coitus.

Tachyris Wall. picks from 2nd, 3rd, 6th, 10th, 11th, and also 2 species from the 3rd Stips of the 1st Tribe, Napaeae !

Pontia Fab. selects from 1st family 4th, and 2nd family 2nd coitus. And the 1st coitus of the 3rd family has 2 species, both of which are put to Dismorphia Hüb., one of the coitus of 1st Tribe, 1st Stirps, Nereides !

* It appears from the above that the name Zerene, supposing a coitus name to be applicable as a generic name, cannot be applied to the species Eurydice, and therefore to Caesonia, as Mr. Scudder has done in his Revision, Zerene only including "bright yellow" butterflies. Let us respect Hubner as well as admire him.

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And so I might go through the rest of the *gentiles* to the end of the Hesperidæ, and for all that matter, through the volume. But I think I have shown the " utter want of agreement between Hübner's groups and modern genera."

How incomplete and indefinite the characters given to the Stirps are I have shown, and yet these are of all the definitions in the book the ones especially requiring careful elaboration. There is nothing in them that prevented Hübner himself from assigning to one Stirps species which are congeneric with species of another. I have given repeated instances of this. The family has the same style of definition as the coitus, based almost wholly on color, and consequently we see that the limits of neither are at all heeded by the modern systematist. The family names are to-day, in spite of laws and canons, ignored as unmanageable, but the coitus are every whit as bad and can only be used by totally disregarding the characters assigned them by Hübner. In fact these characters in the hands of the systematist are as if they had never been written. He makes up his own genera upon principles which Hübner never dreamed of, and takes what species he likes and leaves what he likes all over this book. If he gave his new genus his own name as the maker of it, not an objection could be made. It certainly is his and can go by the name of another only by a fiction. But among the late genus makers—and genus making has become a special craft—the usage has obtained to select for the group of species to be distinguished, a name from some old author, most especially one of Hübner's coitus names, and whether or not any species enumerated under the coitus be included in the new genus is a matter of not the least moment, any more than whether the definition of the coitus is applicable or not, and affix to it the name " Hub., 1816." Now, why is that? It certainly says as plainly as words can make it, " Hubner created this genus and gave it this name, in 1816," which is false. But by saying it and sticking to it, the modern maker by his pertinacity gets a place for his spurious genus as by right of usage before long, and his claim of priority is held by himself and the rest of the guild to cut off all other authors from the fictitious date to the present day. The scandalous injustice of this proceeding ought to be apparent to every one concerned. And apart from the injustice, the immediate effect is to unsettle the nomenclature and to hold it in that condition. Mr. Scudder excuses himself for having introduced hundreds of names from Hubner and other ancient authors as generic, which names never before were heard of, and nearly all of which are used to supercede the work of com-

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petent lepidopterists, by hoping that he "has done something towards introducing some degree of *fixity, logic and precision* in the generic nomenclature." It strikes me rather that "something has been done" in the direction of chaos. And when I consider the mischief caused by the manufacture of spurious genera, and the excessive multiplication of genera on characters almost too trivial to be specific, and the wholesale creation of genera by mere enumeration of species, or by the mention of a single species only as type, which has of late prevailed, I do not hesitate to say that it would have been better to-day for this science had not a new genus been promulgated these last fifteen years. Nearly the whole movement, in this country at least, during this period, has been based in error, and very few indeed of the genera will bear examination.

There is but one remedy for this state of things, and fortunately, it is simple. Let each genus created since the date when the Rules of the British Association were adopted, viz., 1842, be tried by those Rules, and *those found wanting be rejected, no matter who made them.* For genera before 1842, as between two names in use, the prior right should belong to the first named. *But no name then in use should give way to an obsolete or rejected name*, even though the latter be of prior date. And next, *let each genus be called by the name of its real, not reputed, author.* A genus will then stand on its own merits and we shall see but little more of this unseemly and reckless genus making. I hope to see the adoption of Rules to this effect by the Entomological section of the Am. Association at its next meeting, and this will be the first step of real progress in reforming the nomenclature. But the Rules already binding disposes of a very large percentage of the generic names brought forward in the Historical Sketch. Certainly of 400 or more taken from the Tentamen and the various works of Hübner, most especially from this most foolish work, the Verzeichniss bekannter Schmetterlinge.

To show that I do not stand alone in condemnation of Hübner as an authority for genera, I will give in conclusion the language of certain lepidopterists, *facile principes*, whose opinions on this subject are entitled to consideration.

Dr. A. Speyer, Ent. Zeit. Stett. 1875, after stating that he had never seen the Tentamen and therefore could not pass judgment upon its names, thus says of the Verz. bek. Schmett.: "*It passes for an undisputed principle that other rights are needed to introduce a new species than merely giving it a name. It must be accompanied by a description or a drawing*

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which shall make it recognizable. This same principle is carried out no less in regard to generic names. They first receive their authority from the sub-joined sufficient characterization. We may give the most liberal interpretation to this demand, and indeed must do so, especially with regard to the earlier authors. One may perhaps go so far as to regard a genus as sufficiently characterized by the species correctly placed beneath it. *But hardly any one could assert that the great majority of Hübner's genera could be considered as scientifically established even with the most liberal interpretation. The greater part of them are only described according to agreement, often very superficial, in color and markings and perfectly insignificant characteristics. The names in this catalogue have besides no more right to stand than other so-called catalogue names*—for instance, most specific names in the Vienna Catalogue. They may be used in the erection of new genera, since they are mostly well chosen, *but by no means have a right to supplant later but well founded genera.*"

"This work (Hübner's Verzeichniss) had been systematically set aside as an authority by most European entomologists because it was felt that his so-called genera were mere guesses founded on facies alone—happy guesses no doubt sometimes, but as frequently wrong as right—and wholly without such definition as was held, even in his own day, to be required to constitute a new genus. . . . . *The proper course to be taken is to reinstate every name which of late years has been made to give place to one of Hübner's, and further to treat the Verzeichniss as a mere Catalogue which can never be quoted as an authority for genera.* . . . . Such old names as Chionobas, Agraulis, Eresia, Terias, Callidryas, Anthocharis, with many more, are changed for others which most of us have never heard of, and which generally are to be found in no other work than Hübner's obsolete and worthless Catalogue. . . . . As a matter of justice it may be maintained that we should recognize the careful and elaborate definition of a Doubleday or a Westwood, rather than the childish guesses of a Hübner, *and should quote the former as the authority for the genus, even should they out of courtesy have adopted the names of the latter.*" A. R. Wallace, Ann. Address, before cited.

"We cannot approve the names borrowed from the coitus of Hübner and applied by certain entomologists to their so-called genera. Hubner had never seen in nature the sixth part of the Lepidoptera which he has undertaken to group from their superficies. He has given no where a positive character to his coitus, in which the species are often assorted by chance. We could cite more than one instance where a variety is not

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placed in the same group with its parent species. *What would be said of a botanist who should define his genera by the color of the flowers, the marbling or the pinking of the leaves!* It is for these reasons that, after the example of Ochsenheimer, of Latreille, of Godart, of Treitschke, of Duponchel, of Gueneé, etc., we reject this sort of genera and consider them as not having been made." Dr. Boisduval, Spec. Gen. Het. Sphin., 1874.

"We should likewise speak of the classification of Hübner, but we have never been able to comprehend the principle on which it is based. This author so often places in distinct genera species between which are scarcely found specific distinctions, that the whole forms for us a chaos almost unintelligible. In our opinion, while Hübner is the first of iconographers, he is the last of systematists." Boisduval, Spec. Gen., I, p. 153, 1836.

"I must not pass in silence his Systematic Catalogue, to which there seems some disposition to return after it has been justly neglected for thirty years. I cannot deny that it contains some happy hits, some natural groups, but one could scarcely assert that there are many such. On the other hand, he has multiplied genera with an incredible recklessness. Many pages would be required in citing all the examples. . . . . Our Xanthia are scattered over 7 coitus, Agrotis comprises not less than 17! And yet one would be mistaken if he thought this extreme division permitted Hübner to bring together only analogous species. The genera of fewest species are often the most heterogeneous. (Here several examples are given.) His Tribes agree among themselves no better than his genera. I have given these examples because there seems to day a desire to erect the Verzeichniss into an authority, and it was well to show why I consider it, with my associate (Boisduval), as not having been made, and why I have not felt myself obliged to employ the generic names of this still-born work." Gueneé, Spec. Gen. Noct. I, Pref., p. 73, 1852.

NOTES ON PREPARATORY STAGES OF DANAIS ARCHIPPUS.

BY W. H. EDWARDS, COALBURGH, W. VA.

On the 14th May last I found several eggs of *archippus* on milkweed. These hatched on the 17th inst. On the 19th all had passed first moult. On the 21st all had passed second moult. On the 22nd two

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passed third moult. On the 25th these two passed fourth moult, and were one inch long. They continued to grow till the 29th, when they measured 1.8 inch, and in the morning had fixed for chrysalis. Made chrysalis in the afternoon of same day, and the butterflies emerged on 9th June. Time from hatching to chrysalis 12 days. A female, which I confined on milk-weed, laid eggs on 24th May, which hatched on 30th, by which the duration of the egg stage would be 6 days, of the chrysalis 11 days, deposition of the egg to the butterfly 29 days. This is surprisingly rapid. The larvæ which delayed a little the third moult passed the same shortly after, and became butterflies within from one to three days after the first two mentioned. There has been some uncertainty as to the number of moults of this species, some authors giving three only. I have had for two years a series of drawings made by Miss Peart, in 1873, representing all these stages, as followed out by herself, near Philadelphia, and she found and figured the four moults. In this region there are at least two broods annually, the later one appearing about the 1st of October, and the butterflies hybernate.

CORRESPONDENCE.

DEAR SIR,—

In a recent number of the C. E., my friend, W. V. Andrews, desired to know if any of the readers of the ENT. had taken brown larvæ of *Ceratomia quadricornis*. Three years ago they were common here on the English elms, and a large proportion of them were brown; indeed, the green ones were the exception. ROBERT BUNKER, Rochester, N. Y.

DEAR SIR,—

I recently had the pleasure of receiving a female *Smerinthus cerisii* Kirby, which I believe is the only known example of that sex. This interesting specimen was captured in Maine. Yours truly,

GEO. W. PECK, New York.

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The Canadian Entomologist.

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ON CATOCALA PRETIOSA, N. S.

BY J. A. LINTNER,

New York State Museum of Natural History, Albany, N. Y.

The species is closely allied to *C. polygama* Guen. Its distinctive features may be more clearly appreciated by a differential comparison with that species. The basal region is conspicuously and broadly shaded with black, deepening toward the anterior transverse line; in *polygama*, shaded with ferruginous. The anterior transverse line is moderately oblique in its general direction, tending to the posterior third of the internal margin, geminate, distinctly separated by white below and slightly above the submedian: in *polygama* the line is quite oblique, tending to, or very near to, the internal angle; preceded below the submedian by gray and ferruginous scales.

The posterior transverse line has the extra-cellular teeth moderate, unequal, the lower one in cell 4 being improminent; moderately outwardly angulated (not toothed) on the median fold before the sinus; the sinus short, not extending to the middle of the wing, the line narrow with ferruginous and white below it; from the sinus running direct and slightly outwardly oblique to the internal margin, followed by a white line: in *polygama* the two teeth are conspicuous and nearly equal; sharply toothed outwardly on the median fold, as in *cratægi;* sinus long, reaching the middle of the wing, the line broad, with ferruginous on each side and without white below; below the sinus, a long and sharp tooth bordering the internal margin.

The two transverse lines are separated on the submedian nervure by a space equal to the width of cell 2 on the terminal margin, whence they

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run parallel to the internal margin: in *polygama*, they are nearly or entirely united on the submedian, beyond which they widely diverge and again wholly or nearly unite on the internal margin.

The reniform is broadly surrounded by white: in *polygama*, narrowly. The sub-reniform is round, its outline defined by black scales; it touches outwardly the median shade line on vein 2; of the two transverse lines, it is nearer to the posterior, or midway between them: in *polygama*, it is subquadrangular, defined by ferruginous scales, is quite removed from the median shade line, and is nearer to the anterior transverse line, sometimes quite approximate to it.

The subterminal line is dark brown: in *polygama*, pale gray. The posterior wings have the marginal band slightly narrowed on the median fold: in *polygama*, it is separated or quite constricted; beneath, the cellular fold is shaded with black (not in *pretiosa*).

In size it is smaller than *polygama*, five examples of which before me measure in expanse of wings, males 1.80, 1.85 and 1.90 inch; females 2 and 2.1 inches. *Pretiosa* males 1.60 and 1.70 inch; females 1.80 inch. The wings are proportionally broader than in *polygama*, they are more clouded with black basally, with more white medially, and with less ferruginous in the terminal region.

Three examples of the species were captured by me at sugar, at Schenectady, N. Y., last year—the two males, in perfect condition, on July 8th and 10th, and the female, somewhat worn, on July 16th.

A fine example of *C. cratægi* Saunders was also taken by me at sugar, on the 17th of July. I had recognized it as an undescribed species at the time of its capture, and had so indicated it in my collection. With the larval state of nearly all of our Catocalas unknown, it is very gratifying that Mr. Saunders has been so fortunate as to be able to accompany the description of the imago with that of its larva.

C. polygama was taken but once by me at sugar last season, viz., on the 7th of July, in perfect condition. The examples which I have seen of this species present very little variation. The variability which has been ascribed to it has its existence probably in the confounding with it of *cratægi*, *pretiosa* and perhaps some other species.

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NEW SPECIES OF NEBRASKA ACRIDIDÆ.

BY LAWRENCE BRUNER, WEST POINT, NEBRASKA.

Œdipoda Nebrascensis, n. s.

Elytra and wings longer than body; elytra spotted; wings blue at base, gradually merging into black.

Female—Vertex broad; middle foveola circular, open in front with a slight median carina; frontal costa rather narrow, somewhat expanded at ocellus; sulcate, expanding at lower extremity. Lateral costa nearly parallel to frontal. Median carina of pronotum crested, as in *Œ. Carolina*, only much higher; cut in front of middle by last transverse incision of pronotum. Posterior part highly arcuate; anterior part nearly straight. Lateral carinæ slight, approaching a little in front of middle, where they are cut by two transverse incisions; then running parallel to median carina to base of occiput. Posterior margin of pronotum as in *Œ. Carolina*. Elytra wide, slightly arcuate in front, nearly straight behind; about one-third longer than body. Wings one-eighth of an inch less. Posterior femora a little shorter than body, slightly furrowed below. Antennæ about as long as head and thorax.

Color—dried (not alcoholic)—Dirty yellow. Head and pronotum cinereous, with a greenish tinge. Clypeus lurid. Elytra dirty yellow, spotted with brown, the spots on outer half running together, forming irregular narrow transverse bands; median vein brown half its length, bordered by yellow. Spots on inner portion large. Wings bluish at base for about one-fifth their length; outer third yellowish, sprinkled with brown spots at apex. The yellow forms a continuous wide band along the posterior portion and around the inner angle half way to the base. Disk black. Posterior femora crossed on outside by two light brown bands; internally by two black bands. Apex black. Posterior tibiæ yellow, with dark spines. Venter yellow. Dorsum blue with a yellow spot on centre of each of the 1–4 segments, remainder brownish. Sides brown, antennæ rufous.

Length—♀, 1.75 inches; expanse of wings 4 inches; elytra 1.90 inches; posterior femora .85 inch.; posterior tibiae .75 inch; antennae .60 inch.

Habitat—West Point, Nebraska; in August. Male unknown.

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Pezotettix gracilis, n. s.

Frontal costa sulcate below the ocellus in ♂; slightly depressed at the ocellus in female. Elytra small. Median carina of pronotum slight, cut by the last transverse incision of pronotum behind the middle, also by the central transverse incision, nearly straight. Lateral carinae distinct, approaching near the centre. Posterior margin of pronotum obtuse in ♀, sulcate in ♂. Elytra short and narrow. Posterior femora as long as abdomen. Male cerci short, rounded, and slightly spatulate, curved inward; lower ends somewhat curved upward and flattened. Female cerci short, thick and pointed.

Color—Varies from a bright green to an olive brown. Face green; cheeks whitish; a broad black stripe from the eye to last transverse incision of pronotum, sometimes to extremity of pronotum. Below this the pronotum is whitish. Disk of pronotum brown. Occiput brownish. Antennae olive green, tips black. Posterior femora pea green, sometimes olive green, with tip black. Posterior tibiae green; base and spines black. Venter white. Dorsum from green to light brown. Male's last segment of abdomen margined posteriorly with black. Sternum greenish white.

Length of ♀, .75 inch.; elytra .13 inch; posterior femora .45 inch. ♂ .62 inch.; elytra .10 inch.; posterior femora .40 inch.

Habitat—Omaha, Nebraska; August to October.

Pezotettix occidentalis, n. s.

Large, stout. Elytra in female half as long as abdomen; in male about two-fifths as long. Male antennae as long as posterior femora.

Vertex not prominent, carinate; foveola wide, slightly elongate. Frontal costa somewhat sulcate in male; plane in female. Eyes large, inflated in male; ordinary in female. Pronotum with sides parallel; margins acute in male, rounded in female. Posterior transverse incision behind the middle; deep in male, ordinary in female. Elytra about two-fifths the length of abdomen, wedge shape. Four anterior femora inflated in male, much curved. Posterior femora passing abdomen one-fifth of their length. Female cerci short and pointed; male cerci large, flat, strong, slightly notched anteriorly, curving inward at extremity, where they are spatulate. Genitial plate shape of letter U, large and wide. Entire insect sparsely covered by short hair.

Color—Male dark piceous, variegated with white. Face cinereous; cheeks whitish, occiput piceous with a white stripe from eye along lateral

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carinae of pronotum to last transverse incision of pronotum. A wide black stripe on side of pronotum from eye to last transverse incision; below this is a narrow white line bordered below by a narrow black line; remainder dark brown. Eyes posteriorly streaked alternately with black and yellow. Elytra brown, lighter above, unspotted (sometimes a few spots visible). Posterior femora with three white and three black bands; lower inner side and sulcus bright red. Posterior tibiæ red, bluish toward base. Spines near base light; remainder black. Venter yellow.

Female differs from male in being of a uniform brown color. Eyes not colored, and bands on sides of pronotum nearly obsolete in some specimens, dim in others. Ovipositor varies from red to yellow, with black tips.

Dimensions—♀ 1.10 inches; elytra .31 inch.; posterior femora .55 inch. ♂ .95 inch.; elytra .25 inch.; posterior femora .51 inch

Habitat—Omaha, Nebraska; August to November.

ON A NEW CANADIAN BOMBYCID MOTH.

BY A. R. GROTE, BUFFALO, N. Y.

Both sexes of a new genus and species referable to the group *Ptilodeutes* are represented in specimens taken by Mr. Geo. Norman (No. 52) at St. Catharines, and for which I propose the name *Ellida gelida*. A male of this species is also in the collection of the Buffalo Society, from New York State. The eyes are naked, ocelli absent, legs rather short and unarmed. The maxillæ are moderate; labial palpi short, applied to the front, second article shaggily haired, third distinct. The abdomen is untufted, hardly exceeding secondaries. Male antennæ bipectinate, densely setose; female antennæ more shortly and finely bipectinate. Head closely applied to the thorax. Anal hairs in the male gathered at each side, projecting slightly, not forming a prominent furcation as in *Coelodasys*. The habitus recalls the Noctuid group Bombyciae. Fore wings 12-veined, 5 intermediate between 4 and 6, cell open; 7 out of 8; 9 out of 8, a short furcation at apex. Hind wings with veins 7 and 8 separate, 7 running very close to 8 for about three-fourths its length from

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the base of the wing; 5 weak; cell open; 6 out of 7 beyond, not *before*, a slight projection, on 7, which projection indicates the position of the cross vein. It will thus be seen that the neuration differs sensibly from that of the *Bombyciæ (Cymatophoridæ* H. S.) The position of vein 5 is different from that in the *Noctuelitæ;* but attention is called here to the fact that in the genus *Nolaphana* (which possesses ocelli) vein 5 is nearly midway between 4 and 6 on primaries.

Ellida gelida is a gray moth, having a superficial resemblance to *Pseudothyatira expultrix.* The collar is discolorous, pale buff, recalling that of *Pygaera pucephala,* edged with black. The wings are long, costa of primaries convex. Interior line represented by three parallel curved black lines, obsolete inferiorly. A black curved streak in a whitish shading on the disc. Outer and subterminal and basal lines faint. Outer line dentate. Between the subterminal shade and the very narrow even continued terminal line at base of fringes, is a distinct line of blackish brown hue, narrowly interrupted on the veins and inferiorly disconnected in the female specimen before me. Hind wings uniform pale fuscous, with whitish fringes. Beneath whitish fuscous, with a line and spot on hind wings. *Expanse* 42 mil.

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

Since the reprint of Kirby's Fauna Boreali-Americana began, much has been learned concerning the species of Coleoptera therein described or mentioned, so that at the present time very few remain unidentified. Through the kindness of the authorities of the British Museum, every facility was granted to Dr. Leconte and myself for the study of Kirby's types, and the results of these studies have already been made known by Dr. Leconte. It will be noticed in very many places that the synonymy here given differs very greatly from that given by Mr. Bethune, who compiled from the best known sources all that was at the time known or guessed concerning Kirby's species.

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The present paper is necessarily in great part a compilation, but sufficient new material is presented to render it worthy of appearing as a whole, so that Kirby's species may be at once determined without the necessity of consulting scattered publications.

A few words are necessary to a correct understanding of the paper. The species named by Kirby are in small capitals. Should names in their entirety remain valid, no remarks are made, as in 1, 16, &c. Should the generic name only be changed, the species is quoted as "is a ——," as in 25, 28, 37, &c. Should the specific name be changed, the species is quoted as in 3, &c., and the true name is in small capitals also. In some instances, Kirby's species not having been identified, the species have received more recent names and are well known; in this case the latter name (being a synonym) is quoted in italics, as in 58 and 59, so that those having the Kirbyan species under the more recent names may change them.

1. Cicindela hirticollis Say.
2. " repanda Dej.
3. " PROTEUS Kby., is DUODECIMGUTTATA Dej.
4. " OBLIQUATA Kby. This is a variety of the species previously described by Say under the name VULGARIS. Herbst anteriorly named the species TRANQUEBARICA with a false locality.
5. " vulgaris Say (see above).
6. " purpurea Oliv.
7. " ALBILABRIS Kby., is LONGILABRIS Say.
8. Casnonia pensylvanica Dej.
9. Cymindis MARGINATA Kby., is CRIBRICOLLIS Dej.
10. " UNICOLOR Kby. Subsequently described as *hudsonica* Lec.
11. Sericoda BEMBIDIOIDES Kby. is a PLATYNUS.
12. Brachinus cyanipennis Say.
13. Carabus Vietinghovii Adams. This species is found in Alaska and extends its habitat toward British Columbia and also toward the Hudson's Bay region. Numerous specimens were collected by the late Robt. Kennicott in Alaska.
14. " ligatus Knoch is VINCTUS Weber.
15. Calosoma calidum Fab.
16. " FRIGIDUM Kby.

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17. Helobia [Nebria] CASTANIPES Kby. An immature form of N. SAHLBERGI Fisch., described anteriorly to Kirby, from Alaska.
18. Chlaenius sericeus Forst.
19. " IMPUNCTIFRONS Kby. is PENSYLVANICUS Say.
20. " nemoralis Say.
21. " QUADRICOLLIS Kby. is TRICOLOR Dej. *var.*
22. " CORDICOLLIS Kby. This species, anteriorly to Dr. Leconte's visit to the British Museum (1869), was erroneously considered to be *chlorophanus* Dej.
23. " EMARGINATUS (Kby.) The type of this species could not be found in the British Museum. It is not identical with Say's species, and as the name is pre-occupied, it would be better to drop it entirely from our lists.
24. Platynus ANGUSTICOLLIS (Kby.) is not the European species of that name, but our common SINUATUS Dej.
25. Agonum extensicolle Say is a PLATYNUS.
26. " PICIPENNE Kby. is probably the species subsequently described as PLATYNUS *lutulentus* Lec. The varieties E and D are distinct and are Plat. RUFICORNIS Lec.
27. " SORDENS Kby. Has been named in some collections *fuscescens* Chaud.
28. " melanarium Dej. is a PLATYNUS.
29. " SEMINITIDUM Kby. Probably the same as PLATYNUS *chalceus* Lec.
30. " SIMILE Kby. In doubt.
31. " AFFINE Kby. is PLATYNUS *Harrisii* Lec.
32. " ERYTHROPUM Kby. The name is pre-occupied and PLAT. SUBCORDATUS Lec. must be used.
33. " cupripenne Say. is a PLATYNUS.
34. Calathus gregarius Say.
35. Platyderus NITIDUS Kby. is PTEROST. ERYTHROPUS (Dej.)
36. Argutor BICOLOR Kby. is PTEROST. PATRUELIS Dej.
37. " FEMORALIS Kby. is a PTEROSTICHUS.
38. " MANDIBULARIS Kby. is a PTEROSTICHUS.
39. " BREVICORNIS Kby. Probably the same as FASTIDIOSUS Mann. This and the preceding species belong to

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the Cryobius group of Pterostichi, in which the species are very difficult to separate.

40. Omaseus orinomum Knoch. is a PTEROSTICHUS.

41. " NIGRITA Curtis (Kby.) This species is erroneously determined by Kirby and does not appear to differ from PTEROSTICHUS CAUDICALIS Say, from specimens in my cabinet from Hudson's Bay region.

42. " PICICORNIS Kby. is PTEROST. MUTUS Say.

43. Stereocerus SIMILIS Kby. is AMARA HAEMATOPUS (Dej.)

44. Curtonotus convexiusculus Steph. (Kby.) Erroneously determined by Kirby; is AMARA LATICOLLIS Lec.

45. " RUFIMANUS Kby. If the hind angles of the thorax are prominent, as stated by Dr. Leconte (Proc. Acad. 1873, p. 323), this species is rather LATICOLLIS than LACUSTRIS, as there stated. The species of AMARA in this vicinity need a careful revision, when their number will be considerably decreased. No actual comparison of Kirby's and our own types have been made, and any positive expression might mislead.

46. " BREVILABRIS Kby. Identical with the preceding species.

47. " LATIOR Kby. is AMARA *(Bradytus)*. Described since Kirby as *libera* Lec., *laevistriata* Putz. and *Oregona* Lec. (See Trans. Am. Ent. Soc., 1875, p. 128).

48. Poecilus lucublandus Say is a PTEROSTICHUS.

49. " CASTANIPES Kby. is a variety of 48.

50. " chalcites Say is PTEROSTICHUS SAYI Brulle.

51. Amara VULGARIS Latr. (Kby.) is not that species, but ERRATICA Sturm.

52. " INAEQUALIS Kby. is INTERSTITIALIS Dej.

53. " impuncticollis Say.

54. " PALLIPES Kby.

55. " LAEVIPENNIS Kby. is a smooth ERRATICA Sturm.

56. " DISCORS Kby. is CHALCEA Dej.

57. Harpalus PLEURITICUS Kby.

58. " BASILARIS Kby. is *obesulus* Lec.

59. " OCHROPUS Kby. is *desertus* Lec.

60. " INTERPUNCTATUS Kby. is probably merely a variety of ANISODACTYLUS NIGRITA Dej.

61. " LONGIOR Kby. is *longicollis* Lec.

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62. Harpalus LATICOLLIS Kby. is ANISODACTYLUS NIGERRIMUS Dej.
63. " carbonarius Say is ANISODAC. CARB.
64. " ROTUNDICOLLIS Kby. is AMPUTATUS Say.
65. " STEPHENSII Kby. is AMPUTATUS Say.
66. Stenolophus VERSICOLOR Kby. is FULIGINOSUS Dej.
67. Trechus TIBIALIS Kby. is BRADYCELLUS TIBIALIS.
68. " AUFICRUS Kby. is BRADYCELLUS COGNATUS (Gyll).
69. " FLAVIPES Kby. is BRADYCELLUS RUPESTRIS Say.
70. " IMMUNIS Kby. is STENOLOPHUS CONJUNCTUS Say.
71. " SIMILIS Kby. is AGONODERUS COMMA Fab.
72. Isopleurus NITIDUS Kby. is AMARA SUBAENEA Lec.
73. Patrobus americanus Dej. is LONGICORNIS Say.
74. Peryphus BIMACULATUS Kby. This species of BEMBIDIUM occurs also in Colorado.
75. " SORDIDUS Kby. Immature specimen of the preceding.
76. " SCOPULINUS Kby. is BEMB. *gelidum* Lec.
77. " RUPICOLA Kby. is BEMB. RUPESTRE Fab.
78. " CONCOLOR Kby. is BEMB. *salebratum* Lec.
79. " PICIPES Kby. The type of this is in very bad condition. Uncertain.
80. " quadrimaculatus Linn. is a BEMBIDIUM.
81. " NITIDUS Kby. is a BEMBIDIDM.
82. Tachyta PICIPES Kby. is TACHYS NANUS Gyll.
83. Notaphus NIGRIPES Kby. A BEMBIDIUM which occurs also in Oregon and British Columbia.
84. " INTERMEDIUS Kby. is probably BEMBIDIUM *rapidum* Lec.
85. " VARIEGATUS Kby. The specific name is pre-occupied. It is now known as BEMBID. PICTUM Lec.
86. Bembidium impressum Gyll.
87. OPISTHIUS RICHARDSONII Kby. Occurs in British Columbia, Oregon, Northern California, and Colorado.
88. Elaphrus CLAIRVILLII Kby. for a long time called *politus* Lec.
89. " INTERMEDIUS Kby. This species forms one of the varieties of that known in our collections as *Californicus* Mann. I cannot see any difference between this and the European RIPARIUS.
90. " OBSCURIOR Kby. is probably a small *obliteratus* Mann.
91. Notiophilus aquaticus Linn. (Kby.) is SEMISTRIATUS Say.

(To be Continued.)

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ON JACOB HUBNER AND HIS WORKS ON THE BUTTERFLIES AND MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

For a long time that school of Entomologists which has for its basis the view that there are but few genera in the Butterflies and Moths, and that the more minute characters which these insects offer are not of sufficient value to support genera, have held an almost undisputed sway in the scientific literature on the subject. The first opponent of these views was Jacob Hübner, whose works form the subject of the present paper. A single author, in the comparatively obscure town of Augsburg, in Germany, Jacob Hübner found no adherents to his views, and his works fell into obscurity. The Viennese Entomologists misapplied many of the few generic names of Hübner they adopted, and abused him. Their example was followed by the French Entomologists, including the abuse. In England Hübner's ideas found a more favorable reception from Stephens in 1829, and here and there, in Germany itself, a sort of half recognition has been extended to Hübner from time to time, in some few cases and under some limitations.

So far as Hübner's works are concerned, they must be studied from two separate aspects. First as to Hübner's fundamental idea that the Butterflies and Moths offer many genera, independent of the question as to whether the names Hübner proposed in consequence for these genera, be reinstated in modern systems of classification or not.

And here the question arises respecting the value of all systems of classification and as to their purport. And we shall be agreed that while our conceptions of genera and species and other divisions are abstract, the purpose of our system of nomenclature is to express briefly inter-relationship among animals, no less than to distinguish them. Under the view that dissimilar structures are allowed to be embraced under the same generic name, our systems become clearly defective to this extent. And as *the* question of to-day is the origin of the different kinds of animals, we are clearly on the right path if we seek to define our genera with more precision and to associate only those species under one genus which agree in minuter points of structure. Just this sort of nearer and more critical comparison is what we now evidently need in order

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to discuss the question of geographical distribution to any purpose or advantage and to arrive at some nearer comprehension of the way in which species may have differentiated. And it seems reasonable that we should express the results of such comparison in our nomenclature. Not expressing them, their record tends to become obliterated. So that in this direction we find that Jacob Hübner in his work is more nearly up to the requirements of to-day than are his critics. And it is only this serious study of Entomology that relieves the whole subject from the charge of childishness which we hear not unfrequently made against it, and which we cannot well otherwise refute. To merely catalogue species of insects is to bring the study of Entomology down to the level of an arrangement of curiosities of any description. It needs some higher spirit to elevate it and to relieve it from the imputation of uselessness.

The second question with regard to Hübner and his works is whether we are to recognize the right of his generic names, proposed so long ago, to be used now for one or more of the species he included under them. It is a question which must be answered in the affirmative under the law of priority, since Hübner is post-Linnean, and wrote on genera from 1806 to 1828.

But it is a question which is confused by technical objections against the form and style of Hübner's generic definitions. Hübner has published two works which we shall here consider (omitting the question as to "Franck's Catalogue" for the time), viz., the Tentamen and the Verzeichniss. The first is a single leaf and contains a sketch of a system of classification in which a number of generic names are proposed and defined by the enumeration of a single known and named species under each. The second is an attempt to classify all the known Lepidoptera of the world under genera very briefly and superficially described.

To the acceptance of these works and the adoption of the generic names therein contained, comes now Mr. W. H. Edwards in the pages of the CANADIAN ENTOMOLOGIST in opposition, and brings with him Dr. Hagen as an ally and one upon whom he depends as full of a knowledge of the literature on the subject. The attack in the March number is mainly on the Tentamen, and we will see what it consists in.

There is mainly brought forward, not without ingenuity, the plea that Hübner never intended that the Tentamen should be adopted. The argument is sustained in two ways. First by the language of the Tentamen; second by the statement that it was not known to contemporary writers on its subject.

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As to the first, Hübner's language is that he submits his Tentamen to skilled persons to be examined and pronounced upon. And this sort of language cannot be fairly tortured to mean anything more than that the work was experimental and tentative rather than absolute and final. What otherwise is all work on this subject? Skilled persons will use of any work what seems to them best and useful, without regard to the opinion of the author on his own work. That Hübner's attitude was modest does not authorize us to ignore him, and should rather urge us to examine with the more care what he has written.

The true criticism of the statement that the Tentamen was not known to writers of Hübner's time is more difficult to give, nevertheless we will attempt it. And first we will examine what Mr. W. H. Edwards, seconded by Dr. Hagen, has to say on the subject. We quote from pp. 44 and 45 of the CAN. ENT. their argument as follows:

Ochsenheimer, Schmett. Eur. iv, 1816, says: "Hubner has under the title Tentamen, &c., published on a quarto sheet a sketch of a system of Lepidoptera, in which to the divisions adopted by him are given generic names of unequal value. Hubner seems to be aware of this himself, for he says in concluding, 'let no one suppose that this arrangement will require no farther correction.' *This sheet I saw only long after the printing of my 3rd Vol. was done.*" This was then after 1816, as Ochsenheimer's 3rd Vol. bears date that year. Mr. Scudder has inadvertently copied this as 1st Vol., 1807, instead of 3rd Vol., 1816. So as Dr. Hagen, in a note, says, "the Tentamen was not known to the chief Lepidopterologist of his day for ten years or more after it was printed, though he was in intimate communication with Hubner, and that he did not know it shows clearly that Hubner did not think it of importance enough to be communicated to him."

Now we claim that it is a mistaken criticism of the facts to implicate Ochsenheimer as a party to the ignoring of the Tentamen, and that the onus of this procedure falls on Treitschke, his narrower disciple, and on Boisduval, who wrote of "mon genre" at Hübner's expense. And to do this we have to correct Mr. Edwards' dates. The 3rd Volume of Ochsenheimer bears date 1810, instead of 1816. So that, the Tentamen being issued in 1806, Dr. Hagen's *ten* years is reduced at once to four.

We may admire Dr. Hagen's talent for argument, but it is wide of bringing a true conclusion. The times were not favorable to a rapid interchange of publications, and although this consideration may be insufficient, it is not without its force applied to the four years of 1806—1810. But in order to accept Dr. Hagen's conclusion we have to believe that a man deliberately prints a new system of classification "for the purpose of submitting it" to his fellow naturalists and then inexplicably

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"considers it of no importance." That Hübner *did* consider it of importance is shown by his having built the later Verzeichniss upon it. We shall find by careful study that Hübner was a most consistent Entomologist, and the criticism which pronounces him as vacillatory to be worthless. So much is to be plainly gathered from his works themselves.

And, after all, after four years' time Ochsenheimer *does* get the Tentamen, and in his fourth volume, 1816, speaks of it in a manner which shows a desire to adopt what he could of it. His language is both friendly and appreciative, and in his list he quotes it in the synonymy and therein adopts certain of the genera on the authority of the Tentamen, as "*Cosmia*," "*Xylena*," "*Agrotis*," "*Graphiphora*," etc. On the whole he adopts more than he rejects, and where he rejects we are given no reason for the discrimination (e. g. *Heliophila*). But now we can see the value of Mr. W. H. Edwards as a critic. He makes Ochsenheimer to say: "*This sheet I saw only long after the printing of my 3rd Vol. was done*," and comes to a full stop. *But Ochsenheimer comes to no full stop!* No, he goes on, after a comma, *therefore I could not earlier have adopted anything out of it.** So that Ochsenheimer *apologises* for an unavoidable neglect and in his fourth volume does Hübner a tardy but not altogether inadequate justice. For the names above cited, and others afterwards credited by Ochsenheimer's followers to himself, *are* taken by Ochsenheimer from the Tentamen and credited to Hübner by Ochsenheimer himself. And the criticism that pronounces Ochsenheimer the chief Lepidopterologist of his day we cannot accept. Ochsenheimer was, at best, provincial, and from the nature of his work could not be otherwise. He is not to be compared to Hubner for grasp of his subject. His follower, Treitschke, is still narrower and on him and the school to which he belonged falls the blame for having appropriated, misapplied and ignored the work of Hubner.

A final argument of Dr. Hagen's, that the booksellers of the time did not advertise the Tentamen, may be dismissed with the remark that it certainly was published as proved by Ochsenheimer in 1810, and the question, whether the failure to catalogue a work by a bookseller is sufficient to cancel its publication?

I conclude that if we wish to follow Ochsenheimer we must adopt the Tentamen. I draw attention to the fact that Ochsenheimer's genera

* daher Konnte ich fruher nichts davon aufnehmen, 4, viii.

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in the 3rd Volume are equally without diagnosis, and yet have been accepted. It is right here that the struggle has come in between the Hubnerian and Treitschkean ideas as to generic characters in the Lepidoptera. For the time the latter have obtained, and the former have been rejected. But now Hubner's ideas are prevailing, and with them his names will be reinstated in their undoubted right—a right which should not be questioned, for the followers of Treitschke are convicted both of appropriating Hubner's names, and endeavoring to implicate Ochsenheimer after his death in the transaction.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KENTUCKY.

LAVERNA.

L. ? (Anybia ?) gleditschiæella. N. sp.

The form of the palpi is that of *Anybia langiella* St., as represented *Ins. Brit., v. 3*, but the wings are a little longer than those of *langiella* are there represented, though the hinder pair have the same form. The neuration of the fore wings is that of *L. epilobiella (fig'd loc. cit.)* except that the apical vein is obsolete in the single specimen examined by me; that of the hind wings also resembles that of *epilobiella;* indeed, if the dorsal and submedian veins were represented in the figure of *epilobiella*, and the sub-apical or discal branch was produced forwards into the cell, the neuration would be that of this species. All of the wing veins, except the furcate apical branch of the fore wings, are unusually distinct in this species.

In *Laverna*, however, the species are usually rather coarsely scaled and the wings are usually ornamented with tufts of raised scales, whilst this species is remarkable for the fineness of its scales and its perfect smoothness. But the genus *Laverna* is almost as indefinite as *Gelechia* itself. So far as ornamentation is concerned, this species might be placed in *Asyctina.*

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In repose *gleditschiæella* sits very flat upon the surface on which it rests. The ♀ has the last joint of the abdomen long and conical, and the antennae do not quite reach to its apex, while in the ♂ they exactly reach it. The basal joint of the antennae is rather elongate and suddenly clavate, and the stalk is slender and smooth. It seems to walk badly and probably is nocturnal in its habits. It dodges rather clumsily about among the thorns of *Gleditschia triacanthos*, or from a hiding place under one piece of the scaly bark to another, and the larva mines the thorns of the *Gleditschia*.

My attention was first attracted to it by observing numerous empty pupa cases projecting from the large thorns, sometimes two or three from a single thorn, in the latter part of May. As *Gelechia (Helice) palidochrella* Chamb. was swarming around the trunks of the *Gleditschia* trees at the same time, I had little doubt that it was the thorn burrower; however, to make it certain, I gathered some of the thorns, and from them, to my surprise, bred a single specimen of *gleditschiæella*, a "micro" that I had never before seen, though I had captured multitudes of "micros" from the trunks of the same trees. Since then I have taken several specimens by frightening them from their hiding places among the bunches of thorns. I am, however, fully convinced that *palidochrella* also feeds in some way on *Gleditschia*, and I *think* that *Philonome Staintonella* Chamb. most probably does also, and likewise *Semele bifasciella* Chamb. If the latter does not feed on *Gleditschia*, it probably does on Elm.

L. gleditschiæella is dark glossy bronzy brown, tinged also with green in ordinary lights, appearing when the light falls on it golden bronze, in other lights showing purple or even bluish reflections. The anal tuft and rather elongate hairs of the posterior tibiae fulvous in the ♂, but darker in the ♀. *Al. ex.* ½ inch. Kentueky.

An old or worn specimen is a very plain and unattractive insect, but a perfectly fresh specimen is a very fine and handsome one, notwithstanding that it is so nearly unicolorous; its perfect smoothness and gloss, fine scales, elongate wings and ciliae, and rich greenish brown, bronze and purple hues with the changes of light, make it a very handsome species.

The thorns of the *Gleditschia*, after being hollowed out by this larva, are frequently occupied by a small species of Ant.

When the account of this species was first prepared the larva was unknown, and until this spring (1876) I have had no opportunity of investigating its habits. I have found the larvæ of two species feeding

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upon the pith inside the thorns of *G. triacanthos;* the one first described below I am satisfied is the larva of this species ; what the other is I do not attempt to guess, but I append a description of it because of its singular structure.

That which I believe to be the larva of *Gleditschiæella* is about three lines long, rather fat and sluggish, yellowish white, with the head and a line which is interrupted in the middle, across the first segment after the head, just behind its anterior margin, ferruginous. Feet, sixteen. The pupa is not enclosed in a cocoon. I have found a few larvæ and several fresh pupæ in the latter part of April.

The other larva is white, about four lines long, cylindrical, with the segments distinct and clothed with scattered white hairs. The thoracic legs are very distinctly divided into segments, *have no terminal claw*, each segment being surrounded near its apex with a circle of rather stiff ciliæ ; the anal feet are small and indistinct, and *there are no ventral prolegs ; but there are six pairs of dorsal prolegs or large tubercles* which represent them ; these "dorsal prolegs," if I may so call them, are as large and distinct as the true legs ; they have no terminal claw, nor any coronet of tentacles, as in ordinary ventral prolegs, but each one is bifid at its tip, or to speak perhaps as correctly, each one ends in two small tubercles, and *progression is mainly effected by these false legs.* In crawling the thoracic and anal feet rest upon one surface, while the dorsal or false feet rest upon the opposite one, the body being curved so as to accomplish this purpose.

The larvæ of *Gleditschiæella* were found in living thorns, or those which had not been long dead ; and a single larva evidently eats but little of the pith. The larvæ with the dorsal legs were found at the same time in dead thorns, which had previously been burrowed by the larvæ of *Gleditschiæella,* and in which was the small hole through which the imago of that species had emerged the previous year. No other means of ingress or egress was observed besides this hole, and this singular larva could not now pass through this hole. It was feeding on the dead pith. Small white silken cocoons, between three and four lines long, were found in some thorns ; most of them were a year or more old, and were empty, but one of them contained a pupa which unfortunately was destroyed in opening the thorn. Several dead larvæ were also found, but they were so completely encased in multitudes of little Chalcid pupæ that it was impossible to determine the larvæ. A little Chalcid larva was just emerging from one of the larvæ of *Gleditschiæella.*

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L. œnotheræsemenella. N. sp.

Antennae white; the basal joint of the outer surface of the second joint of the palpi, an annulus before the middle of the third joint, and its tip, brown (the third joint sometimes entirely brown). Head white. Fore wings sordid whitish, dusted and overlaid with pale fuscous, with four short longitudinal black lines along the middle of the wing, the first of which is on the fold before the basal fourth; the second is about the middle; the third is about the apical fourth, and the fourth is at the apex. These lines are made of raised scales. There are also two blackish raised tufts, one of which is just before the dorsal ciliae, and the other is a little further back. Hind wings fuscous. The first pair of legs is brown on the anterior surface and whitish behind, second and third pair whitish marked externally with brown. The black lines along the middle of the wing remind one somewhat of similar lines in the European *L. phragmitella*, and *L. cephalonthiella* Chamb. has similar lines. This species, however, is quite distinct from both. *Al. ex.* $\frac{7}{16}$ to $\frac{8}{16}$ inch. Sent to me by Miss Murtfeldt, from St. Louis.

(To be Continued.)

ENTOMOLOGICAL CLUB OF THE A. A. A. S.

We desire to call the attention of entomologists of the U. S. and Canada to the fact that the Entomological Club of the American Association for the Advancement of Science will meet at Buffalo, N. Y., on the 22nd of August, in some room that will be provided by the local committee of the Association. All interested in the subject of Entomology are invited to attend, and to repair at first to the Tifft House for instructions.

J. L. LeConte, Pres.
C. V. Riley, Sec.

In view of the fact that questions of great importance relating to the present and future well-being of Entomology are likely to be discussed at the forthcoming meeting of the Entomological Club, we trust that all the "brethren of the net" who can possibly attend from Canada, as well as the U. S., will endeavor to be present.—Ed. C. E.

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BOOK NOTICES.

United States Geological Survey of the Territories, Vol. x. Monograph of the Geometrid Moths, by A. S. Packard.

Through the kind recommendation of Dr. Packard, we have been favored with a copy of the above work from the "Department of the Interior," at Washington. It is a quarto volume of over 600 pages, with 13 beautiful plates, 6 of which are devoted to delineations of the wing structure of the different families, 1 to the various forms of thorax, &c., and 6 to representations of the insects in their larval and perfect forms. Some idea of the work on these beautiful plates may be formed when it is stated that these latter six plates contain figures of 377 species of Geometrid Moths, besides 66 figures of the larvæ and chrysalids.

The plates illustrating the venation and external anatomy have been drawn by Mr. S. E. Cassino and Dr. Packard—the moths by Mr. L. Trouvelot, of Cambridge, Mass. They are all well executed, but Mr. Trouvelot's work is especially worthy of praise. The many and minute points of difference between the various species are faithfully given, so that the student, with the help of the excellent written descriptions in the text by Dr. Packard, will have little difficulty in determining the species in his possession.

This work is a most valuable contribution to our Entomological literature, bringing together all that is known up to the present time in relation to the Geometrids inhabiting this country north of the southern boundary of the United States, including British America, Arctic America and Greenland. It will give a great stimulus to the further study of this most interesting family of moths. The careful work of years of patient labor and research is evident throughout its pages, and we sincerely hope that its talented author may be spared many years to continue the work thus so well and thoroughly begun. This volume is beautifully got up—the paper and typography excellent, reflecting great credit on the department from whence it is issued, and on the United States government for their enlightened and liberal policy in thus placing in the hands of the scientific student, as well as that of the general public, the material accumulated by the untiring industry of the busy workers of the past, and diffusing a knowledge throughout the country in reference to these matters which could not otherwise have been accessible.

We tender our cordial thanks to Dr. Packard for his kind remembrance of us.

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Eighth Annual Report of the Noxious, Beneficial and other Insects of the State of Missouri, by C. V. Riley, State Entomologist.

We are much indebted to Mr. Riley for a copy of this valuable work. It is got up in the usual excellent style of these Reports, 8vo., 190 p., illustrated with fifty-five excellent wood engravings.

The Report opens with some notes on the Colorado Potato Beetle, followed by articles on Canker Worms, the Army Worm, the Rocky Mountain Locust, the Grape Phylloxera and the Yucca Borer. These articles abound with practical information and suggestions, making the work a very valuable one to the intelligent agriculturist as well as to the entomological student. It would be difficult to estimate the immense good which these eight reports have accomplished, diffusing practical information of the greatest value to the farmer and fruit grower, as well as settling many scientific points of much interest to entomologists. The State of Missouri deserves great credit for her enlightened liberality in supplying the means to enable Mr. Riley to devote himself entirely to this good work, and we believe it will abundantly repay its cost to the State itself in a material way by the saving of grain and fruits from insect destruction, while at the same time it disseminates a knowledge on the subjects treated of over the entire length and breadth of the land.

On Some Insect Deformities, by Dr. H. A. Hagen. Memoirs of the Museum of Comparative Zoology at Harvard College, Cambridge, Mass., 4to 24 p., with one lithograph plate.

Through the kindness of Prof. Agassiz and Dr. Hagen, we have received a copy of the above interesting paper, in which the following subjects are treated of: Perfect Insects with the Larval Head, and Precocious Development of the Caterpillar.

Synonymic List of the Butterflies of America, North of Mexico, by Samuel H. Scudder, Cambridge, Mass., from the Bull. Buf. Soc. Nat. Sci., 8vo., 32 pp.

Fossil Foraminifera of Sumatra, by Henry B. Brady, F.R.S., F.L.S., &c., 8vo., 8 pp., with two excellent lithographic plates. From the Geological Magazine, London, Eng.

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The Canadian Entomologist.

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INQUIRIES CONCERNING THE GENERA OF MR. SCUDDER'S "SYSTEMATIC REVISION."

BY S. H. PEABODY, CHICAGO, ILL.

Soon after the issue of the "Systematic Revision," and while I was trying to master the intricacies of its analysis, it occurred to me to tabulate the generic descriptions in some family, if, haply, I might thus discover the exact points of discrimination. By chance I took first the tribe Adolescentes, producing the table which accompanies this paper. In this table, if any expression or word which could distort the obvious meaning of the author, has been omitted or wrested from its proper connection, such change has been through inadvertence or mistake. In like manner I have tabulated the Dryades, the Hamadryades, the Equites, the Voracia, the Fugacia; I confess that when I came to the work of comparing phrase by phrase the five page descriptions of the genera Papilio and Aglais, my heart failed me. I resolved to wait until my unfledged pinions were equal to these lower and briefer flights of the scientific imagination before attempting this more extended journey.

In view of the introductory passages of the "Revision" which promised to remove "the reproach of Lepidopterists," it was with no little concern that I found my tables "insufficient"; that I was unable to distinguish the differences between the genera grouped in the Adolescentes, or the Equites, or the rest. I have waited now nearly four years for some Philip to say "understandest thou what thou readest?" and to give such elucidation that I could go on in joyful belief. No such apostle of the new-antique has appeared, and I venture to offer this table, with a few thoughts, to my entomological brethren.

The analyses of these generic descriptions show two items: First, that many of the differences expressed exist only in the phraseology, either indicating no differences, whatever, in fact, or differences so slight as to be purely opinionative; second, that other differences are such that they

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may be positively formulated, often numerically stated. For the present, we will admit that these differences, thus accurately expressed, do really exist, and depend upon measurements which may be repeatedly verified.

With the first of these items we need do little more than present a few illustrations; the array in parallel columns will usually bring them into sufficient prominence. The second is of more consequence, for it raises the important question upon which this whole discussion will turn—Are these differences of such a character as will warrant the erection of distinct genera? Mr. Scudder has already answered this question in the affirmative; for us to answer blankly in the negative would be to pit our opinion against his, in which case the weight of authority would very largely and very properly lie on his side.

We must, therefore, briefly inquire into the distinctions which exist between genera and species, as found in law and in usage.

Probably we can appeal to no higher authority upon the law than that of Agassiz, and accordingly we quote his definitions as found in the "Essay on Classification."

"Genera are most closely allied groups of animals differing neither in form nor in complication of structure, but simply in the ultimate structural peculiarities of some of the parts." Eng. Ed., p. 249.

"Genera [are] characterized by ultimate peculiarities of structure in the parts of the body.

"Species [are] characterized by relations and proportions of parts among themselves, and of the individuals to one another and to the surrounding mediums." P. 265.

Here the question turns upon the force of the words "ultimate structural peculiarities." Can they mean that any difference which can be formulated in the ratio of length to breadth in the same part, or of length of one part to length of another part, is a difference of ultimate structure? If one insect has its fore-tibia five-sixths the length of its fore-femur, while another has the same parts in the ratio of four-sixths, or six-sixths, are they for this cause of different genera? Does this principle extend through zoology? Is Gen. Sheridan, who is short and stout, and who, according to Pres. Lincoln, can scratch his ancle without stooping, generically different from Gen. Sherman, who is tall and slender, and whose ancles are evidently out of his reach? Can any one safely affirm of any individual of any species of any genus in the whole realm of nature, that all its ratios of measurement in all its members are identical

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with the corresponding ratios of any other individual existing? There must be a limit to the meaning of these words, or we shall find a genus wherever we find the slightest variation in ultimate structure, that is, a genus for every species, not to say for each individual. An examination of the "Revision" would lead us to suppose that the classification of Butterflies is rapidly drawing to such a condition. When it comes to that, and when each species is the "type" of a distinct genus, what office will remain for genera?

But the other or co-ordinate section of the law distinctly bars this manifestly absurd interpretation of the first section, by making species depend, so far as difference of parts is concerned, upon such differences as involve only the "relations and proportions of parts among themselves." The femero-tibial ratios of five-sixths and six-sixths, for example, are clearly differences of proportion of parts among themselves, and therefore under the law, these differences are not of generic, but only of specific, value.

That this view accords with usage may be abundantly illustrated in every department of Entomology, not forgetting the writings of Mr. Scudder. In a single genus of Coleoptera, lately revised by Dr. Horn, we find assembled species with "thorax broader than long" and "thorax longer than broad"; with antennæ "short" and antennæ "longer than head and thorax"; form "slender," form "broadly oval"; "with wings" and "without wings." In a single genus of Orthoptera Mr. Thomas includes species "with elytra" and "without elytra"; pronotum cylindrical or carinated; antennæ very long or of ordinary length; wings absent or present. In Mr. Scudder's Revision of Crickets will be found tables of measurements of individuals of the same species, in which the ratios differ much more than those in the table of Adolescentes, upon which he bases distinctions of genera. In Dr. Packard's Monograph of the Phalænidæ he includes in the genus Thamnonoma species which have the palpi very long, and palpi short; in Aplodes species which have the first median venule remote from second, and which have the first and second median and posterior discal venules co-originating; in Tephrosia species which have hind tarsi longer than tibia, and hind tarsi shorter than tibia. In the "Revision" itself, Mr. Scudder admits a variation of 41 to 49 joints in the antennæ of different species of the genus Argynnis; it seems, however, that the elastic band which stretches so far would not endure three degrees more of straining to include the antennæ of Speyeria with their 52 joints.

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ANALYSIS OF GENERIC DESCRIPTIONS OF THE TRIBE ADOLESCENTES.

Genus.	LYCÆIDES.	GLAUCOPSYCHE.	CYANIRIS.	EVERES.
Head	Small.	Small.	Small.	Small.
Front	Flat. Very slightly tumid beneath; scarcely surpassing front of eyes, fully as broad as they. Scarcely half as high again as broad.	Nearly flat. Below considerably tumid; as broad as the front view of the eyes. Scarcely half as high again as broad.	Flat. Very slightly fullest below; barely surpassing the front of eyes. Scarcely twice as high as broad.	Nearly flat. A very little bulbous below; barely protruding beyond front of eyes. Scarcely ⅔ as broad, &c. Twice as high as broad.
Eyes	Naked.	Delicately and sparsely pilose with very short hairs.	Delicately and sparsely pilose with short hairs.	Naked.
Antennæ	Scarcely longer than abdomen.	Considerably longer than abdomen.	Slightly longer than abdomen.	Barely longer than abdomen.
No. joints in	About 32.	About 31.	About 34.	About 32.
Do. in club.	12 or 13.	12.	12 or 13.	12.

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Palpi	Slender. Nearly or quite twice as long as eye.	Slender, compressed. Scarcely more than half as long again as eye.	Slender. Scarcely more than half as long again as eye.	Slender. Less than twice as long as eye.
(as the Nos.	2—	1½ +	1½ +	2—)
Ratio of fore tibia to hind	A little more than ⅝.	⅔	A little more than ⅞.	¾
(as the Nos.	.6¼	.6⅔	.6 +	.7½)
Ratio of mid tibia to hind	Scarcely ⅞	⅞	Nearly ⅞	A little shorter.
(as the Nos.	.8—	.8⅓	.8⅓—	.9 or 1.0)
1st Sup'r Br. of subcostal nervure of fore wings arising	In the middle of the outer two-thirds of the upper border of the cell.	Somewhat beyond middle of upper border of the cell.	At scarcely two-thirds the distance from the base to the apex of cell.	A little beyond the middle of the upper border of the cell.
2nd do.	Midway between it and the origin of 1st inferior subcostal nervure.	Midway between this & the origin of first inferior branch.	At less than half way between.	About one-fourth the distance from origin of first to apex of cell.
Cell	Somewhat more than ½ as long as wing.	Somewhat more than ½ as long as wing.	½ as long as wing.	Scarcely ½ as long as wing.

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Let us now examine the table of the Adolescentes, searching for these ultimate peculiarities of structure, not simply differences in the proportions of parts among themselves, which furnish the authority for constructing four genera where entomologists have usually found but one.

After observing the sameness in size of head and flatness of front, we meet at once differences which seem to consist in merely varied forms of phraseology. For what else can we make of these? "Front very slightly tumid beneath"; "below considerably tumid," "very slightly fullest below"; "a very little bulbous below." "Scarcely surpassing, barely surpassing, barely protruding beyond the front of the eyes." What may be the relative weight of the four discriminating words "scarcely, considerably, slightly" and "barely," which state how much the antennæ are longer than the abdomen? Does the ascending scale begin with barely and end with considerably? If so, how do we grade the slightly and scarcely? If these words do not express differences, why use them? If they do, is the difference more than a very small difference in the proportion of parts? What shall we say of these phrases which ring the changes upon the devoted fronts of the Equites? They are said to be "scarcely higher than broad," "fully as broad as high," "scarcely broader than high," "of about equal height and breadth," "fully as high as broad." In the Hamadryades we find yet other variations: "Scarcely as broad as," "somewhat narrower than," "not nearly as broad as," "about three-fourths as broad as." Whoever will take the trouble to develop one of these analytical tables will find abundant illustrations of this nature; we believe that Mr. Scudder himself would be surprised at the marvellous facility with which he has escaped saying the same thing twice in the same way.

The numbers of joints in the antennæ scale like a flight of steps. "About 32" must include as possible at least 31 and 33, unless we reckon like that Massachusetts pauper, who being asked how many were there in the poor house, answered "Between eight and nine of us!" Then we have this ladder:

Cyaniris,	33, 34, 35.
Lycæides and Everes,	31, 32, 33.
Glaucopsyche,	30, 31, 32.

The whole range has but four usual and six possible terms.

The palpi are "scarcely more than half as long again as the eye," "less than twice as long as the eye," or "nearly or quite twice as long as the

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eye." Is the difference between the first and second of these as great as that between sharp six and flat seven of the musical scale?

The ratios said to exist between the lengths of fore, middle and hind tibiæ, are expressed definitely in numbers. If we reduce the fractions to common denominators in the usual way, that we may compare their numerators, we find the terms so large as to be unweildy. Let us change the fractions to tenths; the resulting numbers are, for ratios of fore tibiæ to hind tibiæ, .6¼+, .6⅔, .6+, and .7½; for middle tibiæ to hind tibiæ, they are .8, .8⅓, .8⅓—, .9 or 1.0—. The entire range of variation is less than one and one-half tenths in the first case, less than two-tenths in the second case. The difference between first and third, first series, is one-fortieth; between first and second is one-twenty-fourth. Are these differences, or even the sum of them, ultimate peculiarities of structure?

One item remains, the venation of the wings. The first superior branch of the subcostal nervure arises "in the middle of the outer two-thirds of the upper border of the cell"—is there any circumlocution in this?—"somewhat beyond the middle of the upper border of the cell," "at scarcely two-thirds the distance from the base to the apex of the cell," "a little beyond the middle of the upper border of the cell. In fractions, ⅔, ½+, ⅔—, ½+.

How, then, does Lycæides differ from another, Glaucopsyche, for instance? 1. Its eyes are naked rather than delicately and sparsely pilose with very short hairs. 2. It has about 32 rather than about 31 joints in its antennae. 3. Its palpi are a little less than twice, rather than a little more than one and a half times, as long as the eye. 4. The ratio of fore tibiae to hind tibiae is $\frac{11}{14}$ rather than $\frac{11}{13}$. 5. That of middle tibiae to hind tibiae is $\frac{11}{14}$ rather than $\frac{11}{13}$. 6. The 1st sup. branch of subcostal nervure arises at $\frac{4}{13}$ rather than at $\frac{7}{13}$ the length of the cell. Upon which of these six points rests the distinction between these genera? Will the integration of all these differentials with whatever may be implied in the shades of meaning between scarcely and barely, considerably and slightly, suffice to make a gross sum which amounts to more than a difference in the proportions of parts properly accounted for as specific? Why may not these find ample room and exact determination in the same genus? Any other of the six pairs which these four names would make, if taken two by two, gives a series of differences of the same nature and of equal weight. The discussion of any other of the tables which lie before us leads to conclusions equally forcible and equally direct. In this resuscitation of

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proposed and forgotten genera, this subdividing and limiting of the old and this erection of new, the same method seems to have been followed. There is the same microscopic search for minute differences, the same confusion arising from the use of fractions of different denominators, by which the real amount, or want, of difference evades the understanding, the same felicitous escape from repetition.

If the case is not as we have stated, will some one show wherein? If it is, ought these genera to stand?

Is any genus valid, until it has been substantiated by a full and competent description which shall clearly set forth the points of discrimination between it and other genera, particularly that from which it has been separated?

While the mention of some species in a genus as a type of that genus may be useful as giving a nucleus about which that genus may crystallize, thus providing for future definiteness and fixity, it seems to us that we ought most earnestly to protest against the establishment of a genus by the mere mention of its type. For example, admitting that there is ground for the use of Hübner's name Epargyreus, what is the distinction between it and the proposed new genus Achalarus? It is not enough to answer, perhaps no one is disposed to say, "One skilled in this branch of Entomology will know." The question should be answered for the benefit of the unskilled, the learner. Nor is it enough to say—"We have no space to answer now; we want time for investigation; we will answer hereafter." We believe there are no pre-emption laws in Entomology; that no caveats can be filed at this Patent Office. The laws of priority can cover only so much as one has wrought out and published, not what he gives notice that he expects to find, or intends to publish in the future.

No. of Broods of Danais Archippus.—There positively are three broods of *archippus* here, at *least*. The second is now giving butterflies. I set a female last week and she laid eggs. I saw a chrysalis last week and for several days have seen newly emerged butterflies. The first brood emerged early in June. Very late in the season is a third brood, Sept. or Oct., and these hybernate as butterflies.—W. H. Edwards, W. Virginia.

August 4th, 1876.

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DESCRIPTION OF A NEW SATURNIAN.

BY JAMES BEHRENS, SAN FRANCISCO, CAL.

Saturnia (Aglia) Mendocino, n. sp.

The new species is somewhat related to *S. hera*, the brier-feeding Saturnia *(Eglanterina* Bdv.)

Habitat—The forests of Sequoia Sempervirens, of the Coast range of Mendocino County, Cal.

Time of Flight—June, July.

Description from a male—no females as yet taken.

Expanse of wings, 2½ inches ; of body, ¾ inch.

Antennæ of ♂ broadly feathered, of same reddish brown color as anterior wings.

Head darker than wings.

Prothorax with a narrow transversal white band, and this white band lined with an equally narrow black band. Thorax color of anteriors.

Thorax beneath, and legs and feet, of a beautiful cherry red.

Abdomen above dark, with yellow rings, corresponding with color of posterior wings ; beneath colored like feet and thorax beneath.

Anteriors above smoky reddish chocolate. The usual eye, which is small, leans towards the base of wing on a squarish white field, which white does not appear on under side of wings ; the eye itself is distinct below and fully as perfect as above, showing the yellow and blue and black iris. The apex of anteriors colored scarlet (not orange), narrowed in by a slight band of black, which black band is lined on both sides with a faint blue line. No signs of this apical ornament beneath.

Anteriors beneath ochre yellow, nearly as brilliant as posteriors above. Inner margin very dark ; the eye as mentioned previously ; the apex widely obfuscated.

Posteriors above of a bright yellow, marked by the usual eye, same as that of anteriors, but without any white disk or field. A dark obfuscation from the base. A distinct, comparatively broad, black band (with veins slightly marked) towards outer margin, leaving the margin bright yellow. Fringes somewhat deeper shaded, yellow.

Posteriors below unicolorous, of about same reddish fuscous as anteriors above, with but a reflection of the eye or band of upper surface.

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SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Continued).

92. Omophron SAYI Kby. is AMERICANUM Dej.
93. Haliplus impressus Latr., erroneously determined, is RUFICOLLIS De Geer.
94. Hydroporus nigrolineatus Steph. Not known to us. Is the identification correct? *
95. " parallelus Say.
96. " LAEVIS Kby. This and the preceding seem to me to be merely varieties of *catascopium* Say, which Crotch says is GRISEOSTRIATUS De Geer.
97. " PICATUS Kby.
98. " SIMILIS Kby. is IMPRESSOPUNCTATUS Schall. (fide Crotch).
99. Laccophilus BIGUTTATUS Kby. is PROXIMUS Say.
100. Colymbetes SEMIPUNCTATUS Kby. is a GAURODYTES.
101. " BICOLOR Kby. A GAURODYTES.
102. " PHAEOPTERUS Kby. is probably GAURODYTES *obliteratus* Lec.
103. " BIFARIUS Kby. Placed by Crotch in a new genus, ILYBIOSOMA.
104. " RETICULATUS Kby. is probably identical with GAURODYTES ARCTICUS Payk.
105. " PICIPES Kby. is an ILYBIUS.
106. " ASSIMILIS Kby.
107. " TRISERIATUS Kby. is SCULPTILIS Harris.
108. " RUGICOLLIS Kby. is GRAPHODERES LIBERUS Say.
109. " MACCULLOCHII Kby. is ACILIUS MEDIATUS Say.
110. Dytiscus OOLIGBUKII Kby. is CONFLUENS Say.
111. " HARRISII Kby.
112. " FRANKLINII Kby. is CONFLUENS Say, *var.*

* Dr. David Sharp, of Scotland, is now preparing a monograph of the DYTISCIDAE of this world; and by means of typical specimens from Dr, Leconte and myself, will settle definitely the synonymy of all of Kirby's species in this family.

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113. Cyclinus ASSIMILIS Kby. is DINEUTUS AMERICANUS Linn.
114. Gyrinus IMPRESSICOLLIS Kby. I think the reference to BOREALIS Aubé is correct.
115. " aeneus Leach (Kby.) Kirby's determination is probably incorrect.
116. " VENTRALIS Kby.
117. " ANALIS Kby. Impossible to identify this species. The name is preoccupied. It is not Say's ANALIS.
118. " minutus Fab.
119. Paederus riparius Fab. (Kby.) is LITTORARIUS Grav.
120. Lathrobium PUNCTICOLLE Kby.
121. " GRAVENHORSTI Kby. is CRYPTOBIUM PALLIPES Nord.
122. " bicolor Grav. is a CRYPTOBIUM.
123. Gyrohypnus ASSIMILIS Kby. is XANTHOLINUS CEPHALUS Say.
124. Olophrum MARGINATUM Kby. is an OMALIUM.
125. Alaeochara PALLITARSIS Kby. is a HOMALOTA.
126. Tachyporus ACUDUCTUS Kby. is COPROPORUS VENTRICULUS Er.
127. " AFFINIS Kby.
128. Philonthus politus Linn. (Kby.) is AENEUS Rossi.
129. " MANDIBULARIS Kby. Male of AENEUS.
130. " PICATUS Kby. is BRUNNEUS Grav.
131. " fulvipes? Grav.
132. Staphylinus CHRYSURUS Kby. LEISTOTROPHUS CINGULATUS Grav.
133. Creophilus villosus Grav.
134. Necrophorus velutinus Fab. N. TOMENTOSUS Weber is an older name.
135. " HEBES Kby. is a variety of VESPILLOIDES Herbst.
136. " OBSCURUS Kby. is the *Melsheimeri* ‡ Lec.
137. " MELSHEIMERI Kby. Occurs also in Alaska and is *maritima* Mann.
138. " HALLII Kby. is ORBICOLLIS Say.
139. " PYGMAEUS Kby. is VESPILLOIDES Hbst.
140. Necrodes surinamensis Fab. is SILPHA SURINAMENSIS.
141. Oiceoptoma marginale Fab. An older name is SILPHA NOVEBORACENSIS Voet.
142. " lapponicum Linn. is SILPHA LAPPONICA.
143. " TRITUBERCULATUM Kby. is a SILPHA.
144. " inaequale Fab. is SILPHA INAEQUALIS.

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NOTES ON GEOMETRIDÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Endropia serrata Grote & Robinson, Trans. Am. Ent. Soc., p. 88 (July, 1868).

Geometra serrata Drury, Ill., 1, 40, pl. 20, fig. 4 (1770).

Ennomos concisaria Walk., Part xxxv, 1551 (1866).

Endropia serrataria Pack., 517, pl. 12, fig. 25 (1876).

Northern Illinois, June 25, Dr. Wm. A. Nason. This species seems to range from the Eastern and Middle States to Nebraska, according to Dr. Packard.

Lythria chamaechrysaria.

Mellila chamaechrysaria Grote, Bull. Buff. Soc. Nat. Sci., 1, 13, pl. 1, figs. 1–3.

Lythria rilevaria Pack., p. 221, pl. 9, fig. 43.

I do not see any reason for not uniting these species; my illustration has apparently been overlooked by Dr. Packard.

Selenia Kentaria Grote & Robinson, Trans. Am. Ent. Soc., 1, 359, 1865.

Pericallia Kentaria G. & R., iv., 1, 12, figs. 5–6 ♀, 1867.

It is compared by us with the European *Selenia illunaria*, but our material of the latter was erroneously determined, hence the mistake in the generic name afterwards corrected by ourselves.

Tetracis lorata Grote, Proc. Ent. Soc. Phil., 3, 91, 1864.

Dr. Packard has overlooked the original citation to this species.

Lobophora fusifasciata Walk., C. B. M., Part 24, 1258 (1862).

Larentia longipennis Walk., Part 35, p. 1671 (1866).

Scotosia lobophorata Walk., 25, 1347 (1862).

Lobophora vernata Pack., 5th Rep. Peab. Acad. Sci., 57 (1873).

Lobophora vernata Pack., Phal., 183, pl. 8, fig. 13 (1876).

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Eupithecia fusifasciata G. & R., Trans. Am. Ent. Soc., 2, 82 (1868).

On my visit to the British Museum specimens of this species were registered under different names, the first of which should, I think, stand for the species.

Lobophora atroliturata Walk., C. B. M., 25, 1710 (1862).

Eupethecia geminata Grote, Proc. Ent. Soc. Phil., 6, 29, pl. 5, fig. 6 (1866).

Lobophora geminata Pack., Phal., 184, Plate 8, fig. 14 (1876).

Eupithecia atroliturata G. & R., Trans. Am. Ent. Soc., 2, 83 (1868).

Fresh specimens are green tinted, when faded become yellow, then probably white as described by Professor Packard, who overlooks, apparently, our synonymical reference based on an examination of the British Museum collection.

Choerodes Guenee.

This generic name must, I think, stand. The type of *Eutrapela* is the European *lunaria*. The question as to the generic distinction of *clemitaria* does not interfere, for if it is ultimately separated, it must receive a distinct name. Guenee used *Eutrapela* Hübn. ex. Verz.

The species not referred to *Choerodes* as yet are, apparently, *C. falcata* (Pack.) and *C. fusciferata* (Pack.)

Eutrapela Hübn., Tent.

The type of this genus being the European *lunaria*, our two North American species *Eutr. Kentaria* (G. & R.) and *Eutr. alciphearia* (Walk.) must be referred to it.

Ennomos Treits.

The term *Eugonia* Hübn. is pre-occupied in the butterflies. I had proposed *Eriplatymetra* for *coloradaria* and *angularia*. According to Dr. Packard (I have no specimens) my *coloradaria* is a *Tetracis*.

Eubyja paenulataria (Grote), Proc. Ent. Soc. Phil., 2, 31, pl. 2, fig. 3 (1863).

This species is omitted by Dr. Packard. I think his specimen from Dr. Perley (p. 413) may belong here. I believed to identify the ♂ *E. quernaria* in coll. Mr. Saunders, but have now no specimens of this or *paenulataria* or *cupidaria* to compare.

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Endropia Warneri.

Endropia Warneri Harvey, Bull. Buff. Soc. Nat. Sci., 2, 121 (1874).

Endropia apiciaria Pack., Phal., 502, Plate 12, fig. 9 (1876).

It is doubtless by an unintentional oversight that Dr. Packard has re-described this species.

Brotis vulneraria Hübn., Zutr.

A drawing, which I recognize as of this species, has been shown me by Prof. Hinsdale, of Racine, Wis., where the original was taken. Hübner describes the species as from Bahia. I would not refer it to the Geometræ but to the Noctuæ (Fasciatæ).

Plagodis Kentzingi Grote.

Dr. Packard changes the termination of the specific name. I do not think that anything is gained by the addition of *aria* or *ata* to the specific names in this group; and I think there is every reason why the specific name should be left as written by the original author. And why, *in the same genus*, some names should stand with *aria* after them and some with *ata*, I cannot see (e. g. *Semiothisa*). If *Eud. serrata* should have a different termination on account of the pectinated antennae of the male, it should be *serraria*, one would think, and not *serrataria*. Since the limit between feathered and simple antennae is very difficult to draw, the correct application of these terminations is nearly impossible.

NEW NOCTUIDÆ.

BY LEON F. HARVEY, M. D., BUFFALO, N. Y.

Mamestra orobia, n. s.

Eyes hairy; antennæ pectinate. Thorax and wings grayish fuscous, color of *trifolii;* basal half line white, t a. line geminate, widely separated; t. p. line consisting of a series of white points; subterminal irregular, terminal line black. Orbicular spot large, white ringed with dark centre; reniform constricted at the centre, white margined with a dark filling. Subterminal space shaded light. Beneath of a lighter shade, discal spot and a faint trace of the t. p. line. Secondaries shining fuscous, fringes whitish, beneath lighter, discal spot black, very evident. Expanse 20 m. m. Texas (O. Meske).

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This species is allied to *trifolii*. The antennae are pectinate, whilst in *trifolii* they are simple. In *orobia* the darker costal edge shows the white dots distinctly.

Gortyna appassionata, n. s.

Antennæ simple, base white. Thorax and wings of a dark red color, thorax tufted, basal half line yellow, 3-shaped, enclosing one large and one small yellow spot; exterior to the line a white dot. T. a. line inaugurated by a yellow dot on the costa, irregular, broken yellow; t. p. line geminate, inaugurated same as t. a. line, regularly waved; s. t. line faintly marked. Orbicular nearly round, white; reniform ovate, broken into many white spots by the red stains on the veins, with two perpendicular lines making a centre filled with yellow. Claviform sub-quadrate, bi-lobed, white, red margined; median space between the spots concolorous, below bright yellow, broken into sub-quadrate spots by the narrow median shade line and the red stained veins; terminal space glistening red, subterminal space wide, concolorous purple. The ground color appears as yellow spots in the median space near the costa; fringes concolorous. Beneath lighter than above, glistening, the arcuated line apparent in both wings; inferior wings pale, fuscous stained, with purplish fringes concolorous. Expanse 35 m. m. London (E. B. Reed).

Perhaps the most brilliantly marked species of the genus. It is allied to *nitela*, differs from it by the wider, rounder reniform, the three larger superposed spots on the t. a. line, the wider concolorous subterminal space and the more regular lunulate t. p. line.

Homoptera stylobata, n. s.

Costal margin straight; wings slightly dentate. Fore wings blackish shaded with whitish on the t. a. line and on median space behind over the reniform. Lines black, distinct, perpendicular, t. p. line squarely exserted opposite the cell around the reniform. An interrupted black line before the margin. Fringes cut with whitish opposite the interspaces. Hind wings blackish with obsolete lines; the dotted line before the margin continued. Fringes mostly whitish. Beneath grayish with double distinct common blackish shade bands. Abdomen stout, tufted. Expanse 39–40 m. m. Texas (Belfrage, No. 170). Several examples.

Homoptera mima, n. s.

Allied to the preceding, but smaller, without the whitish shades on fore wings. Reniform with a few white scales. Lines black; sinuate

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t. p. line distinct, even, exserted opposite the cell. Hind wings pale, ashen, with median line and ashen fringes; fore wings with blackish fringe, narrowly cut with pale. Beneath yellow, whitish, black speckled, with common line and black discal points. Expanse 33 m. m. Texas (Belfrage, No. 73). One specimen.

These two species differ by their nearly entire wings and by the obsolescent markings on hind wings, which do not agree with the primaries as strongly as usual. I do not see differences on which to separate them generically.

NEW PYRALIDES.

(II).

BY A. R. GROTE, BUFFALO, N. Y.

Emprepes novalis, n. s.

Fore wings whitish yellow and olive brown. The median field whitish yellow except a costal blotch of the darker tint. Base narrowly whitish yellow, succeeded by an oblique olive brown band. The outer line bordering the median space is nearly upright, a little irregular and slightly notched opposite the cell and again at internal margin. It is followed by the broad olive brown subterminal space. The subterminal line is yellowish, brought near the margin, flexuous, and the veinlets on the terminal space are marked with yellowish. Hind wings unicolorous fuscous. Beneath the terminal portion of both wings is fuscous, neatly and evenly limited from the pale basal portions. Legs pale; thorax somewhat yellowish. Expanse 16 mil. Texas (Belfrage, No. 403, Oct. 7); Bastrop Co. (Mr. Meske); Zeller, No. 385.

Botis octonalis.

Orobaena octonalis Zell., Beitr., 2, 11, Taf. iii, fig. 7.

Botis sexmaculalis Grote, Can. Ent., 8.

Texas (Boll in Mus. C. Z.) Kansas, Prof. Snow. The maxillary palpi are stated by Zeller to be probably wanting and the location of the species uncertain. I have only a single imperfect specimen before me.

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The palpal structure is said by Prof. Zeller to be like that of *Orobaena.* I do not know any of the species which the Professor includes under that generic name.

Mesographe stramentalis Hübn., Zell. Beitr., 1, 74.

This species and its varieties are described by Prof. Zeller, l. c., who considers the European and American specimens to belong to one species. It is not rare in New York State. I have it from Long Island (Tepper); Albany (Lintner); Buffalo. Perhaps this is the *Pionea eunusalis* of Mr. Walker.

Mesographe rimosalis.

Pionea rimosalis Guen., 371.

Taken by myself in Alabama. One specimen (No. 2) sent me by Mr. Fred. Tepper, from Long Island.

Eurycreon sticticalis (Linn.)

Algonquin, Illinois, June 16, Dr. Wm. A. Nason. A specimen sent to Prof. Zeller could not be distinguished by him from the European species.

Zinckenia perspectalis (Hübn.)

New York State and Texas (Belfrage, No. 401, Nov. 22).

Mochlocera Zeller (n. g.)

♂. Eyes naked; antennæ ciliate beneath, brush-like; labial palpi curved upwards across the front, pointed; two very long, thickly scaled rigid processes extend from the base of the antennæ for about one-half the length of these latter, ascending from the inside of the scape and widening towards their tips, where they are heavily scaled. These processes might be taken for the labial palpi at first sight. The neuration has not been examined. I have seen three male specimens. The genus is allied to *Tetralopha* Zell.

Mochlocera Zelleri, n. s.

Fore wings divided into three fields by the median lines. Inner line defining outwardly the blackish basal space, black, with a slight median notch, nearly perpendicular, followed by a white shade. Median space shaded with white, with a short black discal streak. Outer line very finely denticulate, exserted opposite the cell, arising at apical third, black, run-

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ning inwardly below median vein and narrowing the median space thence to internal margin. Terminally the wing is black. A broken black line at base of fringe. Hind wings blackish. Beneath pale blackish with common shade band and black point on disc of hind wings. Expanse 25 mil. Texas (Belfrage, No. 420, April 30); Zeller (No. 378 *mihi)*; Missouri (Prof. Riley, No. 69).

Zophodia dentata Grote.

I have described this species in a paper prepared for Prof. Hayden's Reports. It is larger than *Bollii* Zell., and is at once distinguished and sufficiently characterized by the very deeply and acutely dentate outer line of the fore wings, which arises near the apices and sweeps inwardly to the discal point, thence in a succession of acute and deep inflections accompanied by gray or whitish shades. The species is more blackish than the Texan, the interior line single and more widely produced. One specimen from Clear Creek Canon, Colorado.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

LAVERNA.

L. bifasciella. N. sp.

Palpi with the outer surface of the second joint dark bluish brown or blackish, dusted sparsely with white, the inner surface being white dusted with blackish scales; third joint blackish. Head and tongue white, the vertex with a faint purplish tinge, and dusted with dark brown. Thorax very pale ochreous and white, dusted with blackish scales, and with the anterior margin shining black. Antennae dark brown, the basal joint somewhat silvery towards the tip. Primaries dark brown, in some lights bluish black dusted with white, and the dorsal margin with some dark dusting, from the base to the last fascia, which is just before the ciliae; the base is white faintly tinged with pale ochreous; a little before the

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middle is a rather wide fascia of white and dark brown scales mixed, the dark brown hue prevailing near the costa, where the white is very narrow, while the white prevails towards the white dorsal margin; there is an obliquely transverse spot or ridge of raised dark scales about the middle of the wing, beginning on the costa and margined before with white, and before the ciliae is an oblique white fascia nearest the base on the costal margin. Ciliae of a sordid hue, dusted with white. *Al. ex.* $\frac{7}{16}$ inch. Received from Mr. Behrens, of San Francisco, Cal.

L. unifasciella. N. sp.

Allied to *L. Murtfeldtella* Chamb. and the preceding species, and to *L. propinquella* Stainton, but still more nearly to *L. decorella* Steph. The single specimen before me has the palpi broken off.

Head white dusted with purplish brown scales on the vertex, and all the brown parts of the insect have something of a bluish or purplish gloss. Antennæ brown. Upper surface of the thorax brown anteriorly, passing backwards into white at the apex. Fore wings brown dusted with white scales, the white increasing in quantity in the apical part of the wing. There is a large white spot on the base of the dorsal margin, as in *Murtfeldtella* and *propinquella*, not quite crossing the wing, and separated, as in those species, from the white spot placed a little further back, which in *decorella* is connected with the spot at the base; this and the absence of the white spot within the costal margin, are the most obvious points in which this species differs from *decorella*. Behind the basal white spot in this species is an ochreous streak in the brown and which ends at the second white spot or patch, which, as just stated, is continuous with the basal one in *decorella;* this white spot nearly crosses the wing in this species, but does not quite reach the costa, and is dusted with brown and contains on the fold a short dark brown line of raised scales, as in *decorella*, and which is bordered on the costal side by a small ochreous spot; thence to the fascia the wing is dusted with white scales and streaked about the fold with ochreous. The white fascia is placed just before the ciliæ as in *decorella*, and is oblique, being nearer to the base on the dorsal than on the costal margin, and before it the wing is more dusted with white and not so strongly marked with ochreous as in *decorella*, and so it likewise is behind the fascia, though both before and behind the fascia there is a distinct small ochreous spot or streak within the dorsal margin. There is a row of dark brown spots around the apex. (This *may* represent a hinder marginal line, as the ciliæ are injured.)

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Abdomen brown on the upper surface, the under surface and tuft silvery whitish. Legs brown, tarsi annulate with white. *Al. ex.* 3/8 inch. Behrens, San Francisco.

NEPTICULA.

N. badiocapitella. N. sp.

Vertex rusty or reddish brown; face a little paler or more reddish; palpi silvery; eye caps silvery white; antennae brown. Thorax and patagia white. Fore wings dark iron gray with a white fascia about the middle, the fascia irregularly outlined and wider on the dorsal than on the costal margin; at about the apical fourth are a costal and opposite dorsal white spot, distinct and rather large, which are sometimes faintly connected or nearly so, forming a linear fascia deeply concave towards the base; ciliae white; legs yellowish, except the anterior surface of the first pair, and the outer surface of the hind tibiae; abdomen bluish fuscous. *Al. ex.* 1/6 inch. Kentucky in June. It is a rather coarsely scaled and distinctly marked species.

(To be Continued.)

CORRESPONDENCE.

DEAR SIR,—

I enclose a few words from Prof. P. O. Zeller, to whom I had sent a copy of my paper on the Tentamen, showing his utter condemnation of the present effort of a few of our lepidopterists to resuscitate Hübner. His letter is dated Grünhoff, 23 June, 1876. . . . "I know Scudder's work concerning the Generic Names of Butterflies, and I could not say wherein I do not agree with your verdict upon the same. Since that miserable, worthless Tentamen is such a foundation for Scudder's theory, he will consider himself unfortunate in having mistaken the date of its publication. . . . The Tentamen was printed, not in 1806, but in 1805. . . . Why not leave Hübner's birds and butterflies to sleep quietly in the grave? Since he has disturbed them, they will be shoo'd around for a while, let us hope as uselessly as the Tentamen."

Yours,

W. H EDWARDS.

Coalburgh, 21 July, 1876.

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The Canadian Entomologist.

VOL. VIII. LONDON, ONT., SEPTEMBER, 1876. No. 9

FARTHER NOTES UPON ARGYNNIS MYRINA.

BY W. H. EDWARDS, COALBURGH, W. VA.

In Vol. vii, Oct., 1875, I gave some account of my breeding *myrina* from eggs laid in July, 1875. I am able now to supplement this by the history of an earlier brood. My observations were made last year at Hunter, in the Catskill Mountains, and being at the same place in June of the present year, from 17th June to 1st July, I found this species abundant, and from the rubbed appearance of nearly all the individuals taken by me, I inferred that they had emerged at latest early in June. On the 19th I set two females on violet, in a gauze bag. On the 20th there were several eggs laid. The first butterfly from this lot emerged 15th July, but in their early stages these larvæ were not in my keeping, as I mailed them to Coalburgh. Other females gave eggs on 27th June; the larvæ hatched 3rd July. These I kept by me and brought to Coalburgh, following their changes carefully. The 1st moult occurred July 7th, the 2nd July 10th, the 3rd July 12th, the 4th on 15th; chrysalis on 18th; and the butterfly emerged 23rd July; 26 days from the laying of the egg. This is the history of half a dozen out of the fifty odd of the brood. The others were less regular in their changes, and the last two butterflies emerged 31st July, or 33 days from the egg. There were but four moults, and I was in error in stating last year that the species moulted five times. A remarkable proportion of the butterflies were females, at least four out of five. The first eleven which emerged were all females, and so were several of the last.

I turned the butterflies of this brood loose as they appeared, with the exception of three, hoping to naturalize the species here. They scattered up and down the valley at considerable distances as I occasionally discovered, but I rarely saw one within my grounds. On dissecting one of the three reserved, the abdomen was found filled with nearly mature

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eggs. All these larvæ of both lots proceeded to chrysalis, none of them becoming lethargic, as do larvæ of many species of butterflies in their summer broods.

Early on 27th of July I turned out 12 *myrina*, which had emerged from chrysalis since the previous evening, and about nine o'clock I observed a pair in copulation in the grass near my house. They were perfectly quiet and I was able to examine the female carefully to see if there was any abrasion of scales on thorax above, or on the wings. She was perfect and I have no doubt was one of those turned loose that morning. Passing along an hour later, and seeing this pair still in the same spot, I placed the inner edge of my net gently by the female, and she immediately climbed up, dragging the male after her. From the net they were easily transferred to a box and left in quiet. At 7 p. m. they had not separated. By 6 next morning they had, and I at once set the female on a plant of violet, under a bag. Within an hour several eggs were laid on the leaves, and within 48 hours many more had been laid on the leaves and the bag, when I let the insect fly. I counted 93 eggs in all. I had noticed that the freshest possible females of *tharos* and of *nycteis* lay eggs readily on being shut up with their food plants, and the same thing with *Papilio ajax*, but hardly supposed the whole process was quite so rapid as in the present case. These eggs gave larvæ 4th and 5th of August, and the butterflies from them will again lay the eggs for the hybernating larvæ which will go to make the June brood of next year. Of this last brood of the year I as yet know nothing from observation. Whether the larvæ hybernate when half grown, as do the larvæ of many *Melitæas*, or as soon as hatched from the egg, as do the larvæ of *cybele* and other species of *Argynnis*, remains to be discovered.

In 1875, the eggs laid between 20th and 25th July produced butterflies by 3rd September. The eggs laid by the female 28th July, 1876, produces a corresponding brood with those of July, 1875, just mentioned. And this brood is the aestival of Scudder. But it should be called the autumnal, and the mid-brood, the butterflies of which have emerged between 15th and 31st July, as stated, the aestival, the early brood from hybernating larvæ being the vernal.

Description of Preparatory Stages of A. Myrina:

EGG—conoidal, slightly rounded at base, truncated and rounded at summit; marked by 14 (or about) thin vertical ridges, which are somewhat wavy, and mostly extend from base to summit, not quite meeting

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about the depressed micropyle; some of these ridges anastomose near the top, others lower, on the sides; the spaces between the ridges roundly excavated and crossed by fine striæ.

YOUNG LARVA—Length, .08 inch; cylindrical, slightly tapering posteriorly, deeply creased at the junction of the segments; color pale green, but brown patches nearly cover segments 5, 7, 9 and 11; furnished with rows of tubercles from which spring black hairs, which are long and curved forwards; head obovate, a little broader than 2nd segment, pilose, brownish black.

After 1st moult, length .2 inch; grayish mottled with brown; armed with 6 rows of short, stout, black spines, which have short black bristles; feet and legs blackish; head cordate, smaller than second segment, pilose, black.

After 2nd moult, length .3 inch; cinereous mottled with black, the spines as before; at the base and on outer side of the spines of the 1st lateral row, on the 3rd, 5th, 7th, 9th and 11th segments, a yellow patch; head as before.

After 3rd moult, length $\frac{4}{10}$ inch; cinereous brown, mottled with darker in small patches; a pale black dorsal line, enlarged on each segment into a rounded spot; the yellow patches as before, but rather orange than yellow; spines longer, those of 2nd segment decidedly so, being between two and three times as long as any others and projected forward over the head; head as before, bronze color.

After FOURTH MOULT and MATURE—Length 1 inch; color cinereous brown, mottled with velvet black, there being a large patch at the base of each spine of the two dorsal rows, and which is edged with a pale color; spines long, tapering, irregular, honey-yellow, often orange at base, with black bristles; those on 2nd segment about 3½ times as long as any others and porrected; legs and feet black; head cordate, with rounded vertices, with black bristles over surface; color bronze.

CHRYSALIS—Length .6 inch; compressed laterally throughout; the wing cases very prominent and flaring at base; the head case not much flattened, its vertices prominent, conical, the intervening space being roundly excavated; the mesonotum prominent, sharply compressed, followed by a deep excavation; on the dorsum two rows of sharp, conical tubercles, those on 7th segment much larger than the others, and all anterior to these two gilded; the two tubercles at head case also large, umber colored; color light brown, the wing cases streaked with darker; or the whole surface is a dark brown.

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A SYNONYM OF ANISOPTERYX POMETARIA.

BY B. PICKMAN MANN, CAMBRIDGE, MASS.

In Dr. Packard's Monograph of the Phalænidæ, just issued, the name *Anisopteryx autumnata* is substituted for that of *A. pometaria*, on the ground that the name *A. pometaria* is a synonym of *A. vernata*, and I am quoted as subscribing to the latter proposition. I acknowledge that in Proc. Bost. Soc. Nat. Hist., xv, 382, I applied the name *A. pometaria* to that species which was subsequently shown to be *A. vernata*, but it was at the same time that I applied the name *A. vernata* to that species which I should now call *A. pometaria*, and which Dr. Packard calls *A. autumnata;* I therefore have maintained throughout that the names belong to entirely different species. I have endeavored, in Proc. Bost. Soc. Nat. Hist., xvi, 207, and verbally, to show that these names are not synonyms, and have succeeded so far that after Mr. Morrison had re-named *pometaria*, and was ready to publish his name, he withdrew it ; after Mr. Riley had published a statement that *pometaria* Harris was not *pometaria* Mann,* he published another,† saying that it was. I had made the same mistake previously, which I now attribute to Dr. Packard, but I had not expected to find it made again after it had been corrected so many times.

Quite aside from the question of fact whether Harris did describe the autumn species as *pometaria* or not, there could be no question that I believed it, and that my writings should be so interpreted. I was surprised, therefore, to find my description of the monstrous female of "*A. pometaria* Harr., descr.," quoted under *A. vernata*, especially with a foot note stating explicitly that *vernata* was not intended.

My article in Proc. Bost. Soc. Nat. Hist., xvi, 163, which treats entirely of *pometaria* according to my understanding, is cited by Dr. Packard under both species.

I would therefore correct Dr. Packard's Monograph, p. 402, by erasing lines 13 to 16, 20, 21, 25, and putting *pometaria* in place of *autumnata* wherever it occurs in connection with these species. Moreover, the monstrous female of *pometaria* had four aborted wings, not two, as Dr. Packard states.

* Sixth Mo. Rep., p. 29.

† Seventh Mo. Rep., p. 80.

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NOTES ON CERTAIN VARIATIONS OF SAMIA CECROPIA.

BY C. E. WORTHINGTON, CHICAGO, ILL.

The deceptive effect of the variable border on the apparent shape of the primary wings in *Samia cecropia* appears to have escaped general notice; indeed, in contrasting this species with *S. promethea*, the latter is universally mentioned as having the primaries much broader in proportion to the length. This is perhaps true of the average *cecropia*, but in numerous individuals I have found primaries even broader in proportion than in *S. promethea* ♀, and narrower than in *promethea* ♂, both by traced outlines and shadow projections, in several instances those with a wide light border appearing extremely narrow but proving to be even broader than the average.

This effect also extends to the so-called sexual difference in the wings, the margin usually being broader and lighter and the apical patch more brilliant in the males.

A careful comparison of a considerable number of specimens shows that no reliance can be placed on the breadth as a sexual character, and that even the antennæ (especially of those fed on *Negundo fraxifolium*) sometimes approach so nearly as to be barely distinguishable.

There are strongly marked variations in the apical patch outside of the ≷ line, generally indicated by a purplish reflection, but sometimes brighter; occasionally above, and more frequently below, being a dull red or a brilliant crimson; more rarely over-running the line inwardly; the four black spots immediately inside of the zigzag line are often reduced to two, those nearest the apex being obsolete.

The discal spots vary greatly in color; normally dull red with a white centre, they are sometimes entirely red with no trace of white; in others they will be found almost white with merely a shade of red or pale brown about the margin, and at the sharp end, where color is always present, their shape varies from that of a pear to a long, curved (crescent-shaped) line or a short straight mark, rarely so small as to be almost obsolete.

Usually at the base of the primaries is a dull red spot, surrounded by a black and white line, and at the base of secondaries a prominent white patch extending along the upper margin; in the first either black or white may be wanting, while the latter, so far as regards the base of the wing, is

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occasionally either entirely wanting or existing as a continuation of the margin of the basal patch on primaries; on the upper margin the shade appears to be constant, although sometimes obscured so as to appear a dull gray.

Similar variations are observable in the abdomen, vermillion and white, red, black and white, and rarely dark brown and white (the color of the wings); and in the wings, which may be dark brown sprinkled slightly with gray, and opaque or dull black, and semi-transparent; one specimen in my collection, with the primaries of the first and secondaries of the latter color, presented a curious appearance; this was one of two taken from *Ampelopsis quinquefolia*, the other having both wings thin and silky, and nearly as black as *Papilio asterias*. The palpi usually agree with the body, as do the legs; in this case both are dark red.

Notwithstanding these differences and the wide range in size (4⅜ to 7¼ inches being the extremes of perfect moths in my possession), *cecropia* agrees so well in general appearance that, aside from the black variety mentioned above, a distinctly marked variety is a rarity, the nearest approach I have seen being in four ♂ moths from cocoons found on rose bushes, in which nearly all the space on the primaries between the basal spot and the border, is finely flushed with red, which grows fainter outwardly, the same red flush being continued down the abdominal margin of secondaries, giving the entire moth a reddish hue; the occurrence of red on the primaries is not extremely rare, but I have never seen others than these with red on the secondaries, except in the border.

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Continued).

145. Oiceoptoma americanum Linn. has been known by the ante-Linnæan name of *peltata*.

146. " TERMINATUM Kby. is a variety of the preceding.

147. " AFFINE Kby., variety of 145.

148. " CANADENSE Kby., variety of 145.

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149. Peltis ferruginea Linn.
150. Nitidula obscura Fab.
151. " OSSIUM Kby., same as 150.
152. " discoidea Fab. Subsequently described as OMOSITA *inversa* Lec., from California.
153. Ips DEJEANII Kby. is VITTATUS Say.
154. Choleva SPENCIANA Kby. is a CATOPS.
155. SCAPHIUM CASTANIPES Kby. is very rare. Occurs also in the White Mts., N. H.
156. Leiodes PUNCTATOSTRIATUS Kby. is *Anisotoma indistincta* Lec.
157. Corticaria DENTICULATA Kby. The name is preoccupied and was changed to *Kirbyi* Lec. It is probably DELETUS Mann.
158. Atomaria atra Steph. (Kby.) Incorrectly determined by Kirby and is probably a dark variety of LAETULA Lec.
159. Cryptophagus HUMERALIS Kby. is a TRIPHYLLUS, and is *ruficornis* Lec.
160. " CONCOLOR Kby. A variety of the preceding.
161. Attagenus CYLINDRICUS Kby. Belongs to a new genus, PERIMEGATOMA Horn. Trans. Am. Ent. Soc., 1875, p. 135.
162. " pellio Linn.
163. Dermestes lardarius Linn.
164. " DISSECTOR Kby. is NUBILUS Say.
165. Byrrhus PICIPES Kby. Name is preoccupied and is now KIRBYI Lec.
166. " CONCOLOR Kby. Now known to us. Is not a variety of *Cytilus varius* Fab., but appears to be a small CYCLOPHORUS Kby.
167. " CYCLOPHORUS Kby.
168. " varius Fab. This is an erroneous determination. The species is CYTILUS TRIVITTATUS Mels.
169. Hydrobius fuscipes Linn.
170. " marginellus Fab. Probably an erroneous determination and may be PHILHYDRUS FIMBRIATUS Mels.
171. " melanocephalus Ol. An erroneous determination and is PHILHYDRUS PERPLEXUS Lec. I have specimens from Mr. Pettit which correspond with Kirby's description of both the above species.
172. Hister PAYKULII Kby. is DEPURATOR Say.

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173. Hister HARRISII Kby.
174. Onthophagus latebrosus Fab. is HECATE Panz.
175. " SCABRICOLLIS Kby. is JANUS Panz.
176. Trox arenarius Fab. (Kby.) This may be AEQUALIS Say.
177. Pelidnota punctata Linn.
178. Camptorhina ATRACAPILLA Kby. is SERICA VESPERTINA Schonh.
179. Diplotaxis TRISTIS Kby.
180. Rhizotrogus fervens Gyll. (Kby.) is LACHNOSTERNA FUSCA Fröhl.
181. " DRAKII Kby. A race of 180.
182. Dichelonycha BACKII Kby.
183. " VIRESCENS Kby. is ELONGATULA Schonh. Variety C is SUBVITTATA Lec.
184. " TESTACEA Kby.
185. Cetonia fulgida Fab. is EURYOMIA FULG.
186. Trichius BIGSBII Kby. is GNORIMUS MACULOSUS Kn.
187. " ASSIMILIS Kby. is AFFINIS Gory.
188. " ROTUNDICOLLIS Kby. is PIGER Fab.
189. " VIRIDANS Kby. is AFFINIS Gory.
190. Gymnodus FOVEATUS Kby. ♂
191. " RUGOSUS Kby. ♀ is OSMODERMA SCABRA Beauv.
192. Platycerus piceus Weber (Kby.) is erroneously determined and is DEPRESSUS Lec.
193. Passalus interruptus Linn. (Kby.) is CORNUTUS Fab.
194. Campylus DENTICORNIS Kby.
195. Pedetes BRIGHTWELLI Kby. is an ATHOUS.
196. " (Asaphes) RUFICORNIS Kby. is ASAPHES MEMNONIUS Hbst.
197. Perimecus fulvipes Hbst. (Kby.) is MELANOTUS CASTANIPES Payk.
198. " communis Gyll. is also a MELANOTUS.
199. " SIMILIS Kby. A MELANOTUS, but the synonymy is unknown.
200. Ctenicerus KENDALLI Kby. is CORYMBITES VIRENS Schr.
201. Elater AERIPENNIS Kby. is a CORYMBITES.
202. Buprestis RUSTICORUM Kby. is a variety of MACULIVENTRIS Say.
203. " PAGANORUM Kby. is 202.
204. " NUTTALLI Kby.
205. " lineata Fab.
206. " fasciata Fab.
207. " divaricata Say is a DICERCA.
208. " TENEBROSA Kby. is a DICERCA.

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209. Buprestis TENEBRICA Kby. may be the same as DICERCA *lugubris* Lec.
210. " TRINERVIA Kby. is a CHRYSOBOTHRIS.
211. " PROXIMA Kby. is CHRYSOBOTHRIS SCABRIPENNIS Lap. et Gory.
212. " DRUMMONDII Kby. is a MELANOPHILA.
213. " umbellatarum Fab. (Kby.) is erroneously determined and is ANTHAXIA INORNATA Rand.
214. " appendiculata Fab. (Kby.) is erroneously determined and is MELANOPHILA LONGIPES Say.
215. Agrilus BIVITTATUS Kby. is BILINEATUS Weber.
216. Trachys AURULENTA Kby. is BRACHYS OVATA Weber.
217. " ACUDUCTA Kby. Mr. E. Saunders (Trans. Ent. Soc., London, 1868, p. 60) says this is a CISSEIS and from Australia.
218. Pytho NIGER Kby.
219. " AMERICANA Kby.
220. Trogosita AMERICANA Kby. is probably *corticalis* Mels.
221. Monochamus RESUTOR Kby. is SCUTELLATUS Say.
222. " CONFUSOR Kby.
223. " MARMORATOR Kby. is probably that variety of SCUTELLATUS Say, called *Oregonensis* Lec.
224. Acanthocinus (Graphisurus) PUSILLUS Kby. is now called GRAPHISURUS PUSILLUS Kby.
225. Callidium AGRESTE Kby. is a CRIOCEPHALUS.
226. " striatum Linn. (Kby.) is ASEMUM MOESTUM Hald.
227. " COLLARE Kby. is now GONOCALLUS COLLARIS.
228. " PROTEUS Kby. is now MERIUM PROTEUS.
229. " SIMILE Kby. is 228.
230. " DIMIDIATUM Kby. is a PHYMATODES.
231. " (Tetropium) CINNAMOPTERUM Kby. is known as a TETROPIUM.
232. Clytus UNDATUS Kby. is XYLOTRECHUS UNDULATUS Say.
233. " LUNULATUS Kby. is the same.
234. " FUSCUS Kby. A variety of the same.
235. " LONGIPES Kby. is a NEOCLYTUS.
236. " MURICATULUS Kby. is a NEOCLYTUS and has since been described as *leucozonus* Lap.
237. Hargium lineatum Ol. is a RHAGIUM.

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238. Pachyta LITURATA Kby.
239. Leptura CHRYSOCOMA Kby.
240. " SUBPUBESCENS Kby. is PROXIMA Say.
241. " ERYTHROPTERA Kby. Variety of 242.
242. " canadensis Ol.
243. " TENUIOR Kby. is TYPOCERUS VELUTINUS Ol.
244. " BREVIS Kby. is L. VAGANS Ol.
245. " sexmaculata Linn.
246. " SEMIVITTATA Kby. is L. VITTATA Ol.
247. " GULOSA Kby. is also L. VITTATA Ol.
248. " SUBARGENTATA Kby.
249. " SIMILIS Kby. is *rufibasis* Lec.
250. " LONGICORNIS Kby. is ACMAEOPS *marginalis* Lec.
251. " PROTEUS Kby. is an ACMAEOPS.
252. " LONGICEPS Kby. is ACMAEOPS PRATENSIS Laich.
253. Anobium FOVEATUM Kby. is a HADROBREGMUS.
254. Cis micans Fab. (Kby.) Unknown; seems to be CHEVROLATII Mell.
255. Tomicus pini Say.
256. Apate BIVITTATA Kby. is a XYLOTERES.
257. " RUFITARSIS Kby. is a XYLOTERES unknown to us.
258. " (Lepisomus) RUFIPENNIS Kby. is a POLYGRAPHUS.
259. " (Lepisomus) NIGRICEPS Kby. Probably the same as 258.
260. " (Lepisomus) BREVICORNIS Kby. Unknown.
261. Hylurgus RUFIPENNIS Kby. is a DENDROCTONUS.
262. Calandra pertinax Ol. is a SPHENOPHORUS.
263. Hylobius CONFUSUS Kby.
264. Lepyrus colon Linn.
265. " GEMELLUS Kby.
266. Cleonis VITTATUS Kby. is CLEONUS.
267. MACROPS MACULICOLLIS Kby.
268. " VITTICOLLIS Kby.
269. LEPIDOPHORUS LINEATICOLLIS Kby.
270. Trachyphloeus MELANOTHRIX Kby. Constitutes, with a California species, a new genus, GEODERCES Horn.
271. Pachyrhynchus SCHONHERRI Kby. is ITHYCERUS NOVEBORACENSIS Forst.
272. Attelabus SIMILIS Kby. is ANALIS Illig.
273. " bipustulatus Fabr.

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TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

ASYCHNA.

A. ? pulvella. N. sp.

This species is placed in this genus provisionally. It is certainly not a true *Asychna*. Indeed, almost the only character common to all the species which Mr. Stainton places in this genus is their ornamentation, and in this respect *Laverna ? gleditschiæella* is an *Asychna*, whilst this species is far from it. This species *(pulvella)* differs widely enough from all the others in ornamentation; but structurally it approaches this genus so nearly that rather than construct a new one for it, I place it here provisionally. Taking for comparison Mr. Stainton's figures in Ins. Brit., v. 3, the wings of *pulvella* resemble those of *A. æratella* more nearly than any of the other species. They are, however, more narrow and elongate; the dorsal margin of the fore wings is nearly straight, while the costal curves down to it nearly as in *A. modestella* reversed; that is, the costal of *modestella* represents the dorsal of *pulvella*, and the dorsal of *modestella* is a little more curved than the costal of *pulvella*. The neuration is exactly as in *æratella*, except that the cell is unclosed in the fore wings and in the hind wings *pulvella* has one more branch of the median vein (placed between the second and third of *æratella*), and continued through the cell. The palpi are more like those of *A. terminella*. The antennæ are slender, longer than the body, and shorter than the wings. Its attitude in repose resembles that of *Bedellia somnulentella*, to which it bears some resemblance in coloration.

Head, palpi, antennæ, thorax and fore wings whitish, but so densely dusted with ochreous brown as to obscure the ground color; the antennæ are faintly annulate with whitish, with three large white annulations before their tip, which is also white; the second and third of these annulations are intermediate between the first and the tip. The fore wings have a brown streak along the fold and another further back on the disc, and a small white spot at the end of the cell. The ciliae are grey, those of the apex dusted with ochreous brown. Upper surface of the abdomen of the general hue; beneath it is paler and the anal tuft is silvery white. Legs of the general hue, the tarsi annulate with white and the first pair brownish on their anterior surfaces. *Al. ex.* 3/8 inch. Kentucky in June.

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ELACHISTA.

E. ? cristatella. N. sp.

This insect, of which I have but a single captured specimen, (in good condition, however,) in its depressed head and its forehead rather acutely angulated, as well as in the size and appearance of the antennae, reminds one strongly of *Aeaea ostryæella* Chamb., as it does also in the ornamentation. As, however, *Aeaea* is near *Elachista*, and the palpi in this specimen are more elongate and slender than in *Aeaea*, and I have not examined the neuration, I place it provisionally in *Elachista.*

Head and face white; the palpi iron gray mixed with white. Antennæ brown. Thorax and wings dark iron gray dusted with white; just before the middle the white dusting forms an indistinct line across the wing, faintly indicating a fascia which is margined on the dorsal edge of the wing by a small raised dark brown tuft. The under surface of the thorax and abdomen and the basal joints of the legs are silvery yellowish, the tibiae and tarsi dark brown on their outer surfaces and annulate at the joints with white, and the anal tuft is silvery. *Al. ex.* scant ¼ inch. Kentucky in June.

COLEOPHORA.

C. nigralineella. N. sp.

Second joint of the palpi with a minute tuft at the apex beneath, and basal joint of the antennae with scales projecting in front.

Palpi (except the whitish inner surface), head, thorax and fore wings ochreous; basal two-thirds of the antennae with alternate annulations of white and brown; the apical third slender and white. Hind wings and upper surface of the abdomen brownish slate color, with two short longitudinal blackish lines on top of each abdominal segment, except the last two, and which are very distinct in fresh specimens, but less so in dry ones; under surface of abdomen and anal tuft yellowish silvery; ciliae of both pairs of wings yellowish ochreous, a little paler than the ground color of the fore wings; anterior surface of the fore legs brownish. *Al. ex.* not quite ½ inch. Kentucky; captured in July, and I have in a single instance bred it from a somewhat pistol-formed case which was found attached to a leaf stem of the Black Walnut (*Juglans nigra*). The case is yellow with pistol *handle* brown, except on its under side, where it is white, and there is a triangular projection on top of the *barrel* near the muzzle, by which it was attached to the stem.

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GELECHIA.

G. Clemensella. N. sp.

Second joint of palpi much larger than third, and somewhat brush-like.

Deep roseate with a pale purplish lustre (or perhaps pale ochreous red will be as accurate). The palpi have a dark brown annulus at the base of the third joint and another before its tip; some of the scales are tipped with hoary, and the head, thorax and wings are dusted with dark brown scales, which are aggregated into small specks and spots and are denser in the apical than in the basal half of the wing; the brown spots are more distinct along the costa than elsewhere, and are there equally distinct on the under side; there are three or four small white spots on the disc, and an irregular, not very distinct, white fascia beginning on the dorsal margin near the base, but not extending entirely across the wing. Ciliae of the general hue. *Al. ex.* ¾ inch. Received from Mr. W. H. Stultz, of Easton, Pennsylvania, the former residence of Dr. Clemens, who does not seem to have known the species; at least he has not described it, though it appears to resemble *G. salicifungiella* in some respects.

G. Saundersella. N. sp.

Palpi simple; third joint nearly as long as second, brown; the tip of the second joint, an annulus about the middle of the third and its tip pale creamy yellow. Head creamy yellow dusted with blackish; thorax blackish tipped with pale creamy yellow; fore wings pale creamy yellow densely dusted with blackish scales beneath the fold; a blackish spot on the base of the costal margin, another about the basal fourth on the costal margin, which is not distinctly separated from one placed obliquely behind which touches the fold; another on the costal margin just behind the middle, behind and beneath which is another just above the end of the fold, and the apical part of the wing very densely dusted with blackish; ciliae of the general hue, with a dark brown hinder marginal line (or row of blackish specks) at their base. Hind wings rather deeply emarginate beneath the tip and pale slate color; abdomen pale yellowish tinged with fuscous; anal tuft pale yellowish. Antennæ annulate with pale creamy yellow and blackish. First two pairs of legs dark brown, the tarsi annulate with creamy yellow; hind legs creamy yellow, marked with dark brown or blackish spots. *Al. ex.* a little over ¼ inch. Kentucky in July. I have named this rather pretty little species for the editor of the CANADIAN ENTOMOLOGIST.

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ON FOUR NEW CALIFORNIAN HEPIALI.

BY JAMES BEHRENS, SAN FRANCISCO, CAL.

The species described in this paper are from Mendocino. The genus seems to be more numerously represented on the West than on the East Coast of North America. Some of the new forms resemble the European. To none of these species can I refer Dr. Boisduval's descriptions of *hectoides* or *californicus*.

Hepialus sequoiolus, n. s.

Three specimens. Primaries light brown with five darker, black margined, interrupted bands marked on costa by separated spots, the fourth, just before apex, slightly furcate. The terminal or outer band is extended along the veins to the outer margin, interspaceally lunate. From the median fold to internal margin the first band is composed of silvery white united spots, preceding the second band, which is powdered with black and shows inwardly an ochre line. Between the third and fourth bands below vein 5 to internal margin, runs a similar white and narrower band. There is a basal white dash, above which a blackish shading. Hind wings blackish, with fringes and costal margin marked with brown. Beneath the fore wings are marked with pale brown on costa and reflect partially the bands of upper surface. Thorax camel's hair brown, with the abdomen perhaps paler. *Expanse* 37 to 40 mil.

A single specimen differs by its increased size and the absence of the white bands; else, while paler colored, it seems to agree. I am undecided about the value of this form at the present writing.

Hepialus mendocinolus, n. s.

Five specimens. Allied to the preceding and to *ganna* of Europe, but tinged with reddish and more unicolorous and smaller. The darker bands are obsolete in three specimens. In *ganna* the white bands are often connected and the outer one runs from the apex. In this species the white bands are more oblique, parallel, and obtain over the primaries below the cell. A white dash at base connected with the first white band. The brown of the thorax shows a pink tinge and the blackish hind wings are pinkish on the fringes. *Expanse* 32 to 35 mil.

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The white bands occupy the same position as in *sequoiolus*, but I do not think it is a form of that species, although eventually it may be found the same.

Hepialus Baroni, n. s.

Four specimens. A distinct species, with concolorous primaries on which the bands are hardly legible. In the best marked specimens they are gray, while the wings are tinged with dull red. The third and fourth bands are fused, and the outer edge of the fourth band is even and marked. At first sight there is little visible except the broader, extra-basal, curved gray band, and the band beyond the cell which I call the fourth. There is a subterminal, narrower, or fifth band. Thorax and hind wings blackish tinged with dull red. *Expanse* 32 to 48 mil.

Named for Mr. Baron, of Mendocino, with whom I have spent some pleasant days in the collection of Lepidoptera. Specimens vary much in size.

Hepialus Lenzi, n. s.

Six specimens. The smallest species and the brightest colored. The ground color is blackish and there is a very bright red tinge on the fringes, costa and the bands. Of these but two are visible, ochre in color, margined with bright red; the outer furcate superiorly, the inner rounded, and limiting outwardly the paler base of the wing. The hairs of the thorax have a bright red tinge; the abdomen is more yellowish brown. The blackish hind wings have yellowish fringes. Beneath the legs are tinged with very bright red, and so also is the costal margin of the wings. *Expanse* 25 to 27 mil.

This pretty species I name after Professor Henry Lenz, Curator of the Lubeck Museum.

In conclusion, I express my obligations to Prof. A. R. Grote, Director of the Museum of the Buffalo Society of Natural Sciences, for an examination of my types and his opinion on the same.

After examining my type of *Saturnia mendocino*, described in the ENTOMOLOGIST, Prof. Grote considers it a true *Saturnia*, and points out that in its yellow hind wings it resembles the European *S. carpini* ♂, while it differs from the European species of the genus by the obsolescence of the lines, the concolorous wings and the reduction of the ocellate marks in size.

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MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

In accordance with previous announcement, the members of the Entomological Club met on Tuesday, the 22nd of August, at 2 : 30 p. m., in the rooms of the Buffalo Society of Natural Sciences, Dr. LeConte in the chair. The following members were present : Dr. John L. LeConte, Philadelphia, President ; S. H. Scudder, Cambridge, Mass., Vice-Pres't ; C. V. Riley, St. Louis, Mo., Secretary ; J. A. Lintner, Albany, N. Y.; Dr. H. Hagen, Cambridge, Mass.; Dr. John G. Morris, Baltimore, Md.; B. P. Mann, Cambridge, Mass.; W. Saunders, London, Ont.; Rev. C. J. S. Bethune, Port Hope, Ont.; E. B. Reed, London, Ont.; A. R. Grote, M. M. Maycock, Dr. L. F. Harvey, Henry S. Sprague, O. Reinecke, W. W. Stewart, of Buffalo, and others.

PRESIDENT'S ADDRESS.

After calling the meeting to order, the President read the following address :—

In resuming the chair, which by your kind partiality I occupied at the last meeting of the club, permit me, after thanking you for the honor you have done me in thus calling me a second time to this position, to congratulate you on the evidence of increased interest felt in the branch of Zoology to which we give our attention.

This increased interest is shown not only by the larger attendance at the present meeting of Entomologists from distant residences, but by the increase of correspondence between those who collect and study insects. I have received during the year several applications from new correspondents for advice and assistance in the study of Coleoptera ; and my colleague, Dr. Horn, informs me that the same is the case with himself. Unfortunately I have been obliged to reply to some of the applicants with a temporary negative, as my time has been almost wholly taken up with efforts to complete my memoir on Rhynchophora, now in course of publication by the American Philosophical Society. This memoir would have been finished some weeks ago, but the exceptional inclemency of the summer heat rendered all work with lenses difficult and uncertain. I think I may promise that the MSS. will be complete in a few weeks. Meanwhile I am glad to say that the arrangement of my cabinet specimens is so far perfected that Dr. Horn or I will be willing to name any sets of

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Rhyncophora of the United States or Dominion of Canada, which are sent us, provided that the return of the specimens sent is not required. The subject has been such an extremely troublesome one, and there are still so many uniques in our cabinets, that they need filling up in order to give them that value for future reference which I hope they will possess, and it will also be desirable for the proper recognition of the new genera and species, many of which are very abundant, that specimens should be distributed to foreigners, who have studied this difficult group of objects.

The excellent volume of Dr. A. S. Packard, jr., "Monograph of the Geometrid Moths of the United States," forming Vol. X of the United States Geological Survey of the Territories, requires special mention among the contributions to Entomology since our last meeting. We owe the existence of this volume to the enlightened policy of Dr. F. V. Hayden, Geologist-in-Chief of the Survey, and I hope that a continued appreciation by the National Legislature of the importance of the work done and published by the Survey, will ensure us many future volumes of similar merit.

The ordinary routine work of the description of new genera and species, is going on in the various orders of insects with about the usual degree of rapidity. But from every one comes the same complaint: Too many new forms to be described!

The observations on economic applications of Entomology for the protection of agriculture are also advancing in a most commendable manner, considering that the public and their servants in office still fail to recognize the magnitude of the interests involved.

References to the memoirs contained in the volumes of reports, and to isolated papers in agricultural and other journals, will be found in *Psyche*, a periodical, which, though small, is indispensable to every one occupied in the study of the insects of North America.

I would gladly stop here, but a truthful instinct, a sense of duty to science, and my obligation to you alike forbid silence. I have to speak of a subject of a disagreeable nature.

It is concerning the efforts made by you and other members of the Association at the last meeting at Detroit, to procure the appointment of a Commission for the protection of agriculture against noxious insects; this Commission to be composed of properly informed men of science, and chosen under such circumstances as would prevent the influence of political bias, or personal favoritism. If I do not fatigue your memory too much, you will recollect the memorials that were so extensively signed

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in relation to this subject, copies of which memorials are again before you. These memorials were extensively circulated at the West, and were signed by many of the most influential bodies for the promotion and protection of agriculture in that region. During the winter these memorials were sent to Congress, in the expectation that some proper legislation would follow. One of the Senators, in fact, introduced a bill which seems to have been very carefully considered, and indeed bears upon its face some evidence of scientific guidance. This bill provided for the appointment of three Commissioners for five years, the Commissioners to be nominated by the Council of the National Academy of Science to the Secretary of Interior. This bill, having been referred to the Committee on Agriculture, was returned, completely orchidized, in such form as to provide for one Commissioner, to be appointed by the Department of Agriculture, the very enemy and incubus from which the western agriculturist specially desired to be relieved.

The bill in this form passed the Senate, several of the members taking occasion in the discussion which preceded the passage to talk to the demonstration of their own ignorance of the subject. However, this discussion has been already so severely commented upon in several of the newspapers of the Mississippi Valley, that it is quite unnecessary for me to add anything farther, except the hope that the Legislature which choose the successors of those Senators will have men of better education and higher intelligence offered to them as candidates for the position.

I regret to have been obliged to introduce this unpleasant subject, about which I feel a warmth and severity, unsuited to the position in which you have placed me. I must therefore close by begging you, in your respective localities, to continue aiding me in my endeavor to cause the Government authorities to give proper attention to this most important subject.

The minutes of the last meeting held in Detroit were read by the Secretary, C. V. Riley, and approved.

The consideration of reports of committees was postponed, owing to the non-arrival of some of the members.

Mr. Riley made some remarks upon the variation in the venation of the wings of *Anisopteryx pometaria* (or *A. autumnata*), and exhibited mounted preparations of wings of this insect differing greatly from the figures in Dr. Packard's new work.

Mr. Grote considered the variation of neuration in the Geometridæ as of no great value as a specific distinction.

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Mr. Riley said that he had scarcely ever raised a large number of forms from the egg without finding that in the imago state there appeared to be more than one so-called species. Whenever he used large quantities of material he found this result. He thought, therefore, that writers when describing species should always state the number of specimens they had before them.

Dr. Hagen then read a valuable paper "On Genera," at the conclusion of which he was warmly applauded. This paper will appear in next issue.

On motion of Mr. Grote, the report of the Committee on Nomenclature was then taken up, when Mr. Riley read a majority report of the Committee.

Mr. Scudder did not approve of the course taken in reference to the rules on nomenclature which had been presented, and thought that members of the committee had exceeded their instructions, and desired that the resolution passed at the last meeting, appointing the committee and defining its duties, be read. He thought that the opinions of leading naturalists on this subject should have been gathered and compared.

The resolution giving instructions to the committee was read as follows: "That the Club appoint a committee of five to prepare and present to the Club at its next annual meeting a compendium of the views of the leading Entomologists of the country upon points which, in their judgement, require elucidation, and also to present a series of resolutions touching such points, in order that intelligent discussion may be had upon them and some general agreement, if possible, arrived at."

Mr. Riley urged as reasons why a majority report had been presented, the difficulty of getting the members of the committee together, and the urgent necessity that some action should be taken in the matter without further delay.

Mr. Saunders supported these views, and urged that the opinions of many of the leading Entomologists on the subject of nomenclature had been given in the pages of the CANADIAN ENTOMOLOGIST during the past year, while others had expressed their views by letter to members of the committee; and seeing that there had been no opportunity for the committee to meet together as a whole, he thought it desirable that these resolutions, which had been endorsed by a majority, should be presented as a guide to the discussions which might take place on the subject.

Mr. Scudder did not think this a proper time or place for the introduction of such rules; he fully agreed, however, that it was very desirable to establish stability in nomenclature.

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Mr. Mann regarded Mr. Scudder's remarks as a motion to set aside these rules, and as such was prepared to support it.

Dr. Hagen, in a few words, gave a sketch of the history of nomenclature, showing how tidal waves of new names had been poured from time to time on the Entomological world with the greatest zeal on the part of those who had introduced them; that in many instances these changes were unnecessary and produced confusion instead of establishing order. He thought it highly necessary that some understanding should be arrived at among Entomologists which would lead to greater stability in nomenclature.

Mr. E. B. Reed spoke for those who had comparatively little time to devote to Entomology, and thought that they were a class who should be considered, and that while it was perhaps no great task for those who devoted their whole time to Entomological studies to master the great number of new generic and specific names from time to time introduced, it was imposing a burden on their less fortunate brethren which was grievous to be borne, which was, in fact, more than they could bear, and tended to discourage many and deter others from entering on the study of Entomology. He urged that it was from among the ranks of these beginners that some of the future leaders of Entomological science would be drawn, and it was well to consider what effect these discouraging circumstances would have on the present and future progress of the study.

After some further discussion, the resolutions were referred back to the committee to report on to-morrow. Meanwhile they were ordered to be printed for the members, so that discussion could be had upon them.

EVENING SESSION.

At 7.30 the meeting was again called to order, the President in the chair.

Mr. Riley offered some remarks on a parasite, a mite which attacked the Colorado Potato Beetle. This insect (of which mounted specimens for microscopic examination were submitted) is furnished with a strange and extraordinary development of what he supposed were the maxillæ, by which it was able to attach itself to the Doryphora, and at the same time extract nourishment as well. He thought it was an organ somewhat similar in character to the extensile maxillæ of the larvæ of Dragon Flies.

Mr. Scudder thought that since they appeared to him to be jointed, they must be a palpus of some sort.

Dr. LeConte, after further examination, was of opinion that they were not jointed.

(To be Continued.)

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The Canadian Entomologist.

VOL. VIII. LONDON, ONT., OCTOBER, 1876. No. 10

MEETINGS OF THE ENTOMOLOGICAL CLUB OF THE AMERICAN ASSOCIATION FOR THE ADVANCEMENT OF SCIENCE.

(Concluded from September No.)

Mr. Scudder then read an interesting paper on "Mimicry in Butterflies explained by Natural Selection," quoting largely from a recent contribution by Fritz Muller on this subject, in which he gives the results of observations made by him on butterflies in Southern Brazil. This paper will appear in *Psyche*, the organ of the Cambridge Entomological Club.

Mr. Riley gave the result of some observations on the eggs of *Corydalis cornutus*, from which it would appear that the mass of eggs hitherto regarded as belonging to this species are probably those of a *Belostoma*. He had found in one day thirty or forty patches of eggs which he believed to be those of *Corydalis cornutus* on the leaves of trees whose branches overhung the water. These flat patches were very strangely arranged and contained an immense number of eggs, often numbering between three and four thousand in a patch. The eggs are at first translucent, but become darker as they approach maturity, when the young larvæ break through the eggs beneath.

Dr. Morris doubted whether these really were the eggs of *C. cornutus*, and questioned whether the larva was aquatic at all.

Dr. Hagen thought that there was something strange in reference to these insects. Mr. Riley had kindly sent him a large number of eggs, but when hatched he had failed in every attempt to keep the young larvæ alive. Since they are furnished with both branchia and stigmata, he thought they must be regarded as water insects.

Mr. Lintner had found the larvæ under stones, but when they enter the chrysalis state they make their way into the water, and in this condition they are often captured in large numbers and used as fish bait.

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Mr. Riley said that the larvæ in Missouri are frequently found in water, and he had no doubt but that the eggs he had referred to were those of *Corydalis cornutus*.

Mr. Scudder stated that Mr. Sanborn had frequently taken large numbers of the larvæ in the water in the neighborhood of Cambridge.

Mr. Saunders had never found them in the water, but had frequently captured them buried in moist sand or under stones along the banks of rivers.

Mr. Riley next exhibited to the Club some silken masses containing eggs of *Hydrophilus triangularis*, which were very remarkable and interesting.

Mr. Saunders offered some remarks on a mass of pupæ and escaping insects of *Calopteron reticulatum*, which he found one morning early in summer at the roots of some long grass. The mass was fully as large as a hen's egg, and must have contained some hundreds of individuals. A large number of the freshly escaped insects were captured with a view to ascertain whether there was much variation in the markings and whether the form *terminalis*, which is said to be a variety of *reticulatum*, could be found among them. He saw none approaching this latter form—all were well marked specimens of *reticulatum*.

Dr. LeConte mentioned the curious fact that in some species of *Calopteron* the larval skin was not shed when it pupated, but that the larva skin and pupa skin both remained *in situ* until the perfect insect escaped.

Dr. Morris then made some interesting remarks on the mouth parts of the woodpeckers.

Mr. Riley exhibited specimens of blown larvæ very nicely set up; he thinks, however, that in this condition they are scarcely of value for scientific study, and for this purpose prefers the specimens preserved in alcohol.

Mr. Scudder differed from Mr. Riley, and thinks that the advantages are in favor of the blown specimens, and much prefers to study larvæ in this way.

Dr. Hagen agreed with Mr. Scudder that blown larvæ were advantageous for study.

Dr. Morris asked if any of the gentlemen present who were in the habit of raising larvæ, had made any observations in reference to the length of time the development of the perfect insect may be retarded.

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He stated that three or four years since he had placed a number of cocoons of *S. cynthia* on a shelf in his house, and that after lying there all that time some of them had this year produced the perfect insect.

Dr. Hagen referred to an instance related by Kirby & Spence where a beetle, *Buprestis splendida*, was ascertained to have existed in the wood of a pine table more than twenty years (7th edition, p. 121).

Mr. Saunders mentioned the fact that the perfect insect of *Œcanthus niveus* frequently came to sugar at night, when they were readily captured. He thought that where they were very numerous this method of trapping them might be employed with advantage.

Mr. Lintner observed that he had taken 16 species of *Catocala* at sugar this season, and that a friend of his who has been sugaring industriously has found the *Catocalas* to be most abundant about midnight.

On the 24th another meeting of the Club was held at 2 p.m., the President in the chair.

The Committee on Nomenclature, consisting of Dr. LeConte, S. H. Scudder, A. R. Grote, C. V. Riley and W. Saunders, reported a set of rules, on some of which they were unanimous, while on others there was a divided opinion. They had given all the attention to the subject possible within the limited time at their disposal, but had not found time to consider the explanations offered in the majority report presented, and suggested that these be referred back to the Committee with power to print such explanations as may be agreed on with the rules.

The following are the rules submitted :

1. The binominal system, as originated by Linnæus, is the only one to be recognized. The use of a third word, however, connected with the second by a hyphen, as is common and desirable in the case of gall insects, *e. g.*, *Cynips quercus-palustris*, is not to be considered as an infraction of this rule. (Unanimous.)

2. Where a specific name has been generally adopted during a period of twenty years, such name shall not be changed for one of prior date. (Divided opinion.)

3. The name placed after a genus should be that of the author who established the genus in the sense in which it is actually used, but the name of the author who first proposed the term should be cited in brackets. (Unanimous.)

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4. No generic or specific name should be acknowledged which has not been printed in a published work. (Unanimous.)

5. A generic name, when once established, should never be cancelled in any subsequent subdivision of the group, but retained in a restricted sense for one of the constituent portions of the original genus. (Unanimous.)

6. In constructing family names they should end in *idæ*. (Divided opinion.)

7. The tribe should occupy an intermediate place between the subfamily and genus. (Unanimous.)

8. The authority for the species and not for the generic combination should follow the name of an insect. (Divided opinion.)

9. The proposition of a genus by simple designation of a type is to be greatly deprecated. All new names should be accompanied by ample definitions that will permit no doubt as to the species intended or as to the characters of the genus proposed. (Unanimous.)

10. No description should be made from a figure. (Unanimous.)

11. The number of individuals upon which either a specific or generic diagnosis is based should always be stated. (Unanimous.)

After a lengthy discussion, on motion of Mr. E. B. Reed, the following resolution was unanimously passed :

That the report of the committee be adopted, and that any rules on which this committee have expressed a divided opinion have a marginal note attached thereto, reciting such fact.

It was also resolved that all the explanations, &c., offered in the majority report be referred back to the committee with power to print such explanations as may be agreed on, with the rules.

Moved by Rev. C. J. S. Bethune, seconded by S. H. Scudder—That no alteration or addition to the rules now adopted be made, unless such alteration or addition be proposed at one annual meeting of the Club, and be adopted at a subsequent annual meeting. Carried unanimously.

The election of officers for the ensuing year then took place, resulting as follows: President, Dr. LeConte; Vice-President, S. H. Scudder; Secretary, C. V. Riley.

Mr. Scudder brought to the notice of the members a pattern insect box, which he believed to be pest-proof. These boxes are exceedingly

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well made (manufacturers, Hancock & Greeley, Cambridgeport, Mass.), are about 19 x 15 in., and are sold at $2.70 each, without cork.

Mr. Saunders suggested the desirability of the Club appointing a permanent committee to whom disputed points in reference to Entomological matters might be referred. On motion of Mr. Mann, seconded by Mr. Saunders, it was resolved that the Permanent Committee of the Club shall consist of the President, as chairman, and four other members to be named by him.

Mr. Lintner presented to the meeting a very complete and extensive list of insects taken at sugar by him during the present season. These were arranged in a tabular form in a very neat and methodical manner, showing at a glance the insects taken each evening, and whether they were abundant or scarce.

On motion of Mr. Riley, Dr. Larkin was requested to bring before the Club some facts in reference to a mite said to be parasitic on the human subject, when he read a very amusing letter from an afflicted patient in reference to this matter. The Club then adjourned.

LARVA OF ANAPHORA AGROTIPENNELLA.

BY MISS MARY E. MURTFELDT, KIRKWOOD, ST. LOUIS, MO.

In Vol. 4, p. 137, of the CANADIAN ENTOMOLOGIST, Mr. Grote first published a description of the large and characteristic Tineid above named. The imago has been very common with us for several years, but until the present season its larval history had eluded my investigation.

Early in April I found among the roots of a bit of white clover sod a very active and singular larva, whose long and rather sprangling thoracic legs gave it, at first glance, the appearance of a Coleopterous larva. A second look, however, discovered the characteristics of a Lepidopteron of which the following description was taken :

Length, 0.75 inch. ; diameter greatest at head and 1st joint, slightly tapering thence posteriorly. Incisions quite deep. Color a dark purple brown, the general surface dull, having the appearance of very fine

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stippling, but variegated with conspicuous, slightly elevated, polished spots, eight on each thoracic, and ten on each abdominal joint. The anal segment and the one immediately preceding it lighter in color than the others, and somewhat translucent. Head horizontal, broad and thick, of a highly polished black color, the triangular face outlined by a fine line of brown. Basal joint of antennæ transparent, 2nd joint tipped with black, terminal joint entirely black. Maxillæ similar. Thoracic legs unusually long, black, except at the joints, where they are translucent cinereous. Venter and prolegs—the latter only moderately developed—of a translucent smoky brown, the anal pair variegated with irregular patches of opaque dark brown.

This larva was placed in a large jar partially filled with earth, and from time to time the clover sod was renewed; but I saw nothing more of it until about the 1st of May, when, thinking it to be dead, I was proceeding to sift the earth in the jar. My attention was soon attracted by a long string of webby matter in the soil, which I at first supposed was some sort of fungus growth, although remarkably tough and strong for anything of that kind. As I was pulling it to pieces, a shining black head was suddenly protruded from one end, and I at once recognized the missing larva. The webby substance proved to be a silken gallery, white and smooth inside, which constituted the concealed retreat of this interesting little creature. The gallery has an open entrance at the surface of the ground, from which its inmate emerges at night to feed. A little pressure from below forced the larva from its hiding place, and I was enabled to observe that it had increased in size, the length being about one inch with a diameter of 0.15 inch. at the 1st joint; the color was also a shade lighter than when my description was taken; otherwise it was unchanged.

June 16th I carefully unearthed the gallery a second time, and found it to be nearly six inches in length, descending by irregular windings to the bottom of the jar, two and one-half inches. About mid-way reposed the insect in the pupa state. The chrysalis is slender, elongate, the abdominal segments sharply edged, but not serrated, and of a mahogany brown color. The palpal sheaths are conspicuous, extending down on the ventral side as far as those of the antennæ. June 29th the moth issued, and I was delighted that it proved to be the species of *Anaphora* whose larval habits I had long desired to ascertain.

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LIST OF CATOCALÆ OBSERVED IN THE VICINITY OF CINCINNATI, OHIO, 1876.

BY CHARLES DURY, CINCINNATI, O.

Catocala Schrank.

Group 1—Secondaries black without bands:

Viduata Guen., the largest black-winged species; rare; 3 taken in 10 years.

Lacrymosa Guen., rather common this season, but only 1 seen in 10 years before.

Desperata Guen., not rare.

Retecta Grote, not abundant.

Robinsonii Grote, not abundant; occurs in fall only.

Levettei Grote (= Judith Streck.), rare; occurs in early summer.

Epione Drury, abundant; in early summer comes freely to sugar, sometimes before dark.

Tristis Edwards, very rare; the smallest black-winged species; only one specimen seen.

Obscura Strecker, abundant.

Flebilis Grote, not abundant.

Insolabilis Guen., rare previous to 1872; now abundant.

Var. Residua Grote, not abundant.

Group 2—Secondaries red with black bands:

Cara Guen., abundant; 150 taken this summer.

Amatrix Hüb., abundant.

Ilia Cram., abundant; very variable.

Innubens Guen., abundant.

Var. Scintillans Grote, not rare; this species may properly belong in Group 3; reared on Walnut.

Ultronia Hüb., abundant.

Marmorata Edwards, rare; one specimen of this princely colored species taken this summer.

Parta Guen., abundant; reared on Willow.

Coccinata Grote, rare.

Unijuga Walk., not abundant; appears late; one specimen taken October 6th.

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Group 3—Secondaries yellow with black bands or band :

Neogama Guen., abundant ; reared on Walnut.
Subnata Grote, not rare.
Piatrix Grote, abundant.
Palaeogama Guen., very abundant.
Var. Phalanga Grote, not abundant.
Habilis Grote, not abundant.
Serena Edwards, not abundant.
Nebulosa Edwards, not rare in 1874.
Cerogama Guen., rare.
Illecta Walk., rare ; taken in July feeding on blossoms of *Catalpa.*
Grynea Cram., abundant ; appears early.
Minuta Edwards, not abundant.
Polygama Guen., not rare.
Var. Mira Grote, not abundant.
Var. Pretiosa Lintner, not abundant.
Fratercula G. & R., rare ; one specimen taken.
Androphila Guen., not abundant.
Var. Lineella Grote, not abundant.

Forty Species and Varieties.

NOTES ON NOCTUÆ.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Segetia fidicularia Morr.

This species, which I have referred to *Caradrina* and as a synonym of *C. multifera* Walk., in the Check List, seems to me identical with the European *Caradrina cubicularis* S. V. A single European specimen of the latter has the common line beneath more extended, the hind wings whiter (♂'s compared) ; these characters are not, I think, likely to be constant. There are no other differences. I have a single poor Cali-

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fornian specimen which may belong here. On page 13 of my Check List I would then make the following correction :

456. cubicularis *(S. V.)*

Segetia fidicularia Morrison.
? Caradrina multifera Walker.

Caradrina flavimaculata Harvey.

I have examined Dr. Harvey's type and a second Californian specimen. I regard both as extreme varieties of *Laphygma frugiperda* (Abb. & Sm.) In the Californian specimens the fore wings are dusty grey, pale, with only the stigmata obscure yellowish. This name, bearing the No. 1114 in my Check List, must then be referred to No. 358 among the synonymy.

Hadena interna Grote.

I find on a nearer comparison that this name is founded on a very dark specimen of *H. delicata* Grote, wanting the green shading on the reniform, costal region and subterminal line, which characterizes fresh specimens of *delicata*. The name, which is numbered 274 in my Check List, must then be referred as a synonym to No. 269.

Ipimorpha subvexa, n. s.

♂. This species is of an olive fuscous gray and resembles in color the European *subtusa*, but is very much larger and wants the claviform. The external pale margin to this spot is to be perceived in *pleonectusa;* this is not indicated in *subvexa*, which also has the orbicular much reduced. The t. p. line shows no bending on the subterminal fold, and it is slightly more outwardly rounded opposite the cell than in either of the allied species. The median yellowish lines are accompanied by dark edging as in the European *subtusa*. The s. t. line is accompanied by quite heavy preceding darker shading. Terminal line dotted, blackish. There is a faint median shade below the reniform. The basal-half line and t. a. line are further apart on costa than in *pleonectusa*. The stigmata are disproportionate, owing to the small size of the orbicular, which is much smaller than in *subtusa*. Hind wings fuscous with pale costal region and pale, faintly interlined fringes. Thorax and abdomen above olivaceous fuscous, concolorous with primaries. The t. a. line seems to show a faint notch on median vein.

Exp. 35 mil. *Hab.* Texas (Belfrage, May 12, No. 632).

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Chytoryza, n. g.

♂ ♀. This form I would refer to the series of *Anomis*, *Aletia*, *Pteraetholix*. It much resembles the latter in size and color, but it differs by the external margin of the primaries being even, not sinuate, and the want of the ♂ venational characters. Eyes naked, prominent, legs unarmed, abdomen smooth, cylindrical, untufted; wings wide and ample, thorax smooth, untufted. The shape of the wings recalls *Poaphila*, but the apices are blunt, not pointed. Male antennæ simple, ciliate beneath slender.

Chytoryza tecta, n. s.

♂ ♀. Primaries cupreous brown with the lines fine, denticulate accompanied by whitish scales. Reniform conspicuous, being inferiorly filled in with white or yellowish scales, forming a prominent spot which strikes the eye at once. The upper portion of the reniform is obsoletely indicated. The brown shade of the subterminal space deepens up to the s. t. line, which is relieved outwardly by a fine powdering of pale scales, Fringes blackish, paler at the tips. Secondaries wholly blackish, without line, with fringes whitish at tips, at base obsoletely interlined. Beneath pale, hind wings irrorate, with a median denticulate line and small black discal mark preceded by an obsolete dash. Fore wings darker with the terminal space and costal region shaded with yellowish. Legs pale, thorax above like fore wings. *Expanse* 23 mil. Texas (O. Meske).

SYNONYMY OF THE COLEOPTERA OF THE FAUNA BOREALI-AMERICANA, KIRBY.

BY GEO. H. HORN, M. D., PHILADELPHIA, PA.

(Concluded).

274. APOTOMUS ovatus Fab. belongs to the genus PTEROCOLUS.
275. Anthribus fasciatus Oliv. is a TROPIDERES.
276. Chlamys plicata Oliv.
277. Cryptocephalus pubescens Fab. is a PACHYBRACHYS.
278. " notatus Fab. is SELLATUS Suff.

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279. Eumolpis vitis Fab. is correctly determined, but is an ADOXUS.
280. Chrysomela philadelphica Linn.
281. " CONFINIS Kby. is *C. spiraeae* Say and a variety of the preceding.
282. " BIGSBYANA Kby.
283. " multipunctata Say.
284. " CLIVICOLLIS Kby. This name should remain. The *C. trimaculata* Fab. is the same, but the name was pre-occupied by Linneus.
285. " rufipes De Geer is C. PALLIDA Linn., a GONIOCTENA.
286. Phaedon Adonidis Pallas. is an ENTOMOSCELIS.
287. " raphani Fab. Probably a correct determination. The species is known in American cabinets as GASTROPHYSA *formosa* Say.
288. " polygoni Linn. is a GASTROPHYSA.
289. Phyllodecta vitellinae Linn.
290. Haltica VICINA Kby. appears to be DISONYCHA ALTERNATA Illig.
291. " PUNCTICOLLIS Kby. is DISONYCHA TRIANGULARIS Say.
292. Galeruca OLIVIERI Kby. is PHYLLOBROTICA DECORATA Say.
293. " CANADENSIS Kby. A TRIRHABDA, and Crotch thinks it a variety of TOMENTOSA Linn.
294. " sagittariæ Gyll. This species and its allies form the genus GALERUCELLA Crotch.
295. " BILINEATA Kby. is a variety of GALERUCELLA NOTULATA Fab.
296. " MARGINELLA Kby. is a GALERUCELLA.
297. Orsodacna TIBIALIS Kby.
298. " CHILDRENI Kby. These two are considered identical, and the latter name adopted.
299. Haemonia NIGRICORNIS Kby. This seems to be the same as that subsequently described by Lacordaire as *Melsheimeri*. I have seen Canadian specimens which do not differ.
300. Donacia FEMORALIS Kby.
301. " FLAVIPES Kby.
302. " AFFINIS Kby. is KIRBYI Lac.
303. " EMARGINATA Kby.
304. " PROXIMA Kby.
305. " CUPRÆA Kby.

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306. Donacia HIRTICOLLIS Kby.
307. " æqualis Say.
308. Hispa bicolor Oliv. is an ODONTOTA.
309. Coccinella EPISCOPALIS Kby. is an ANISOSTICTA.
310. " tredecimpunctata Linn. is a HIPPODAMIA.
311. " TRIDENS Kby. is HIPPODAMIA PARENTHESIS Say.
312. " QUINQUESIGNATA Kby. is a HIPPODAMIA.
313. " QUINQUENOTATA Kby. In the revision of the Coccinellidæ Trans. Am. Ent. Soc., 1873, p. 370, Crotch allows the name to remain. In his general revision (published posthumously) London, 1874, the name is placed as a synonym of TRANSVERSOGUTTATA, which is probably correct.
314. " TRICUSPIS Kby. In the London publication the name by Kirby is said to be pre-occupied and changed to KIRBYI by Crotch, but is allowed to remain in the American publication.
315. " INCARNATA Kby. is ANISOCALVIA DUODECIMMACULATA Gebl.
316. Pimelia ALTERNATA Kby. is ELEODES TRICOSTATA Say.
317. Upis ceramboides Linn.
318. Tenebrio molitor Linn.
319. " pensylvanicus Kn. is a NYCTOBATES.
320. Diaperis bicornis Ol. is a HOPLOCEPHALA.
321. Bolitophagus cornutus Fab. is BOLITOTHERUS BIFURCUS Fab.
322. " OBCORDATUS Kby. is a PHELLOPSIS.
323. MERACANTHA CANADENSIS Kby. is CONTRACTA Beauv.
324. Arthromacra DONACIOIDES Kby. is AENEA Say.
325. Cistela ERYTHROPA Kby. is ANDROCHIRUS *luteipes* Lec., which is not rare in Canada.
326. Xylita buprestoides Payk. X. LAEVIGATA Hellen. is an older name.
327. Notoxus monodon Fab.
328. Cantharis UNICOLOR Kby. is a MACROBASIS, *cinerea* || Fab. and *Fabricii* Lec. are its synonyms.
329. Meloe IMPRESSA Kby.
330. " NIGRA Kby.
331. Dasytes FOVEICOLLIS Kby. is a DOLICHOSOMA.
332. Necrobia violacea Linn. is a CORYNETES.

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333. Thanasimus ABDOMINALIS Kby. is *nubilus* Klug, a variety of UNDULATUS Say.
334. Cyphon FUSCICEPS Kby.
335. Telephorus ater Linn. (Kby.) is erroneously determined and is FRAXINI Say.
336. " WESTWOODII Kby. The legs of this species are dark. It seems to me merely a variety of the next.
337. " SAMOUELLII Kby.
338. " CURTISII Kby. This and the preceding are the same.
339. " PUNCTICOLLIS Kby. is a PODABRUS.
340. " LAEVICOLLIS Kby. is a PODABRUS.
341. " MANDIBULARIS Kby. does not differ from FRAXINI Say.
342. " BENNETII Kby. is PODABRUS TRICOSTATUS Say.
343. Lampyris corrusca Linn. is an ELLYCHNIA.

Synopsis of Kirby's Species.

Number of species described as new by Kirby	238
Those which retain Kirby's specific names and are known to us	111
Number which must be considered synonyms	108
Specific names pre-occupied and a more recent name used	6
Species in doubt and undetermined by us	10
To be dropped (name pre-occupied and type lost in one instance).	2
Two species mixed under one name	2
Number of species quoted from previous authors	105
Of these there are correctly determined	68
Those which must be placed in synonymy on account of incorrect determination or otherwise	35
Uncertain and unknown to us	2
Australian species described in error	1

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ON GENERA.

BY DR. H. HAGEN, CAMBRIDGE, MASS.

(Read before the Entomological Club of the A. A. A. S., at Buffalo, N. Y.)

There will hardly be a naturalist who has not spent considerable time to study the questions—What is a genus, and what are generic characters? Indeed, work is nearly impossible without having taken a position with regard to these questions. A full record of the literature, even the most condensed one, would be here out of place, but I have been induced by a recent and most surprising discovery bearing upon this question to make this communication. I have been speaking here only about *natural* genera. The consideration of the genus as an artificial division differs fundamentally, and to avoid mistake we should not call artificial divisions by this name. The characters of artificial genera depend solely upon the taste of the worker and the convenience of separating into groups animals and plants. All species are considered to belong to the same natural genus which agree in structural characters, external and internal, or anatomical ones in the different stages, in transformation, in the manner of living. These definitions of a genus are accepted as well by naturalists who are strong Darwinians as those who oppose the development theory. In a prize essay of the Jena University, D. P. Mayer, a pupil of Prof. Haeckel, in a paper on the "Ontogeny and Phylogeny of Insects," enlarges this definition in so far as he asks for a conformity in the embryological characters. I believe no one will object that this definition is a good and exhaustive one; but if we attempt to use it in a special case we become bewildered by the astonishing amount of characters unknown to us, and the impossibility to make them out for our work. At present we know hardly well enough the external characters of the imago. Of other characters our knowledge is merely fragmentary and often a *tabula rasa*. We may say that a century of hard work will not fill these gaps in our knowledge. It is obvious that we cannot wait till this enormous amount of work is done. And it is certain that naturalists will not and can not stop creating new genera.

Genera created with such a limited amount of knowledge will depend upon the experience and taste of the worker. Many of such genera will have to be modified or dropped by a farther advancing knowledge.

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The most important question (what are generic characters?) is still unanswered.

The large literature and the difference of opinion emitted by pro minent authorities seem to prove that a sufficient affirmative answer is impossible till our knowledge is further advanced. But here, as in other abstract questions, we can proceed in a negative manner by exclusion.

Genera consist of a number of related species. If we knew the character of the species, the specific character, we can by exclusion come nearer to the character of the genus. Species differ by structural character, and as the species form the lowest degree of the classification, we can be sure that species must differ at least by minutest points of structure.

I think there is no objection of consequence possible. I know very well that differences in minuter points of structure have been considered as generic characters. But naturalists beginning with the construction and definition of the higher degrees of class, order, family, &c., used up all characters at hand, till, coming to genera, nothing was left but minute differences of structure; the simple consequence of having used specific characters for generic ones was that nearly every species was considered to be a genus.

I said before that species must differ at least by minuter points of structure. The discovery which I mentioned before proves that structural characters of species are more important, and can by a different manner of living be changed in such a way as to represent forms which were formerly believed to belong to different genera. *Branchipus* and *Artemia*, belonging to the Phyllopod Crustacea, are represented by several species here and in Europe. The two genera are nearly related one to the other, and differ principally in the following points: *Artemia* has eight post-abdominal segments, the last one very long. *Branchipus* has nine post-abdominal segments, the last two of equal size. *Artemia* has three articulated claspers in the male; *Branchipus* two articulated claspers. *Artemia* is often propagated by Parthenogenesis, *Branchipus* never.

Nobody will deny that those characters of structure go very far beyond minuter points of structure, and are marked well enough to justify the separation sixty years ago by Dr. Leach. Now, it is proved that not only the species of *Artemia* known up to to-day from Europe, Asia and Africa, but even some species of *Branchipus* belong to one and the same genus and species. In the American fauna five species of *Artemia* and three of *Branchipus* are described; of course they will have to be studied again

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in a similar manner as the European ones. The two European species of *Artemia* are remarkably different. *Artemia salina* has a strongly bifid tail surrounded by 15 to 20 bristles and narrow gills; *Artemia mulhauseni* has a rounded tail without bristles, and very large gills. This latter species lives in pools of a very concentrated salt water of 25° Beaumé; the other species in common salt water of about 8°. In 1871 a dam which surrounded a salt pool containing *Artemia mulhauseni*, broke down by accident and the sea water washed in at the same time; *Artemia salina*, which abounds in the sea water, appeared in large numbers in the pool. The dam was immediately repaired, and in the space of three years the amount of the salt in the pool arrived gradually at the same concentration as before.

A Russian naturalist, Mr. Schmaukevitch, living near the spot and studying carefully *Artemia*, was astonished to find the species somewhat changed in every following generation, till in three years the *Artemia salina* was changed entirely into *mulhauseni*. The fact was so extraordinary that he decided to confirm it by a more conclusive proof. He raised at home in open glass dishes *Artemia salina*, and by successive additions of salt to the water, he was able to transform the species into *Artemia mulhauseni*. To make the counter proof he diluted the water gradually and the species returned to the form of *Artemia salina*. But by continued dilution of the water he was more surprised to find that in the third generations the long abdominal segment began to be separated into two segments, and finally to be changed as in a *Branchipus*. He found later in salt pools of only four to five degrees (living together) *Artemia salina* and *Branchipus spinosa*, and in water with a lower degree of salt two other related species, *Branchipus ferox* and *media*.

Mr. Schmaukevitch has made similar experiments with similar results on *Daphnia*, *Cyclops* and *Canthocamptus*, which he has not yet published. There can be no doubt about the facts under such conclusive proof, and Prof. V. Siebold is now engaged in raising the American species from Salt Lake for similar experiments. These facts oblige us to consider all these different forms as belonging to one and the same species, since it is possible to change at will one form into another by altering the conditions of living. As long as this is possible they cannot be considered as differentiating or Darwinian species. We have now the proof that specific characters exist which do not depend on minuter points of structure. Therefore we are taught that we must considerably enlarge the characters of species and those of the genus.

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What has been thus proven in Crustacea will certainly be observed also with other Articulates. Since insects do not possess a post-abdomen, there cannot occur the same differences as in the case cited, but analogous ones will not be wanting. It is obvious that so-called "salt insects" are the first ones which will need new and careful study. Those known are Coleoptera, Diptera, Hemiptera and Orthoptera, and the species are often nearly related to other ones which do not live in salt regions. Further, it is evident that similar changes will be the result of different conditions of life. So-called "local varieties" are certainly nothing else, and a vast field of observation and study is opened by the remarkable discoveries of Mr. Schmaukevitch. I believe that we are now justified when we exclude from generic characters all the following ones :

1. Every character based on the number of parts, when the number ceases to be a small one ; the more so when it varies in related species. If a number is larger than about a dozen, we can never rely upon the constancy of the number in antennal joints or anal appendages. In spines, bristles, spurs, a much smaller number is constant ; transversal veins of the wings belong to the same category.

2. The external coating of the body, consisting in hairs, scales and other appendages, is not a generic character. The hairs, tufts, brushes, spines, spurs, are often only sexual and can not be considered generic characters ; also, hairy eyes, since we find this character changing in the most related species and probably in the same species in Diptera.

3. The presence or want of the ocelli or eyes is not a generic character.

4. The veins of the wings give only to a certain degree generic characters, viz : the principal branches, but certainly not after their bifurcation.

Having arrived so far by exclusion, it is important to state what is left for generic characters.

So far as I am advanced in the study of generic characters, I think the following should be used :

1. The form and relation of the three principal parts of the body.

2. The organs providing nutrition (mouth parts).

3. The organs making possible the working of the mouth parts, *i. e.*, the organs of locomotion.

The anatomical characters may be of prominent help. At present our knowledge as to their details is too limited to admit our using them to a

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profitable extent. We begin to be better acquainted with the previous stages, and this acquaintance will bring these characters into more prominence. I doubt embryological characters to be of generic value. But very little is certainly known about them, and nothing known is ready for our use. The parts serving for propagation have probably a higher value than generic characters. Characters for genera should be of a co-ordinate value. I think it is obvious that a genus should never be accepted if its characters are not satisfactorily given, and that genera based on the mere specification of a type should never be accepted.

CORRESPONDENCE.

DEAR SIR,—

In the early part of June I found on the Wax-Myrtle (*Myrica cerifera*) three larvæ unknown then to me. I regret now that want of time prevented me from making an accurate description of them, but my notes simply say: "Looks like a Geometra—may be small Catocala; prettily marked with dark grey; central segments underneath white or light grey."

Only one of the caterpillars produced an imago, and this proved to be *Catocala badia*. It was about fourteen days only in the chrysalis state, and I am now forced to the conclusion that *C. badia* must be double brooded.

W. V. ANDREWS.

P. S.—From what I have observed of the larval habits and appearance of *Catocala*, I am convinced that this genus should be very close to *Geometra*. W. V. A.

Brooklyn, July 7th, 1876.

EXTRACT FROM A LETTER.

DEAR SIR,—

As an example of retarded development, let me mention that three or four years ago I laid aside some old cocoons of *Samia cynthia*, which I thought were empty, and to my amazement, three splendid specimens have this season made their appearance. I know that wonderful stories are told about the abnormally long continuance of some Coleoptera in the chrysalis form, but I never before observed a similar instance in Lepidoptera. Do you know of any?

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How are you off for *Schaphinotus elevatas* up there in Ontario? A few days ago, in half an hour, I took thirty from under old railroad ties lying along the track. I was sufficiently *elevated* with my success for one day, and ceased further operations, lest I might exterminate the species!

J. C. MORRIS, Baltimore, Md.

IMPORTANT CAPTURES.

DEAR SIR,—

I made, as I think, a very important capture on the 26th of August which you and some of your readers may be interested in knowing, viz., two fine, fresh and absolutely perfect examples of *Catocala marmorata* Edwards. This is, I think, unquestionably the handsomest of all our known species of *Catocala*. I was not a little surprised, and as might well be imagined, delighted beyond measure to find two such unexpected strangers. My friend, Mr. Charles Dury, of Cincinnati, informs me in a letter received from him a few days ago that he also took one this season in his locality. A figure and description of this truly regal insect may be found in Strecker's work, Plate 9, No. 6. In a note accompanying his description he says: "One can but regret that so little concerning this fine species is known; the original description contains no further remarks than 'from Yerka, California,' and we can only hope that time, which 'at last sets all things even,' will enable us to receive specimens and learn more concerning this superb insect."

My specimens are both males; they were found on the trunks of two separate trees (White Wood or Tulip tree), fifty or sixty feet apart, about five feet from the ground, and both were started before I noticed them, but their flight was very short—only darting around to the opposite side of the tree, where they remained perfectly quiet until I covered them with the bottle.

The peculiar brown dash or band which obliquely traverses the primaries near the posterior extremity, is more dense in my specimens than is represented in Strecker's figure. Mr. Dury says in his it is quite black.

The abdomen of Mr. S.'s figure is, as he tells us, nearly imaginary, the specimen he had to work from not having any remaining, and he was not certain even as to which sex it belonged. The abdomen of mine is very much like *parta*, but heavier, and a shade darker. Length of body 1½ in.; diameter of abdomen in middle, 3½ lines. Anal brush white beneath and blackish above.

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Both specimens are alike in size and expand 3 $\frac{5}{16}$ in. No one could fail to be impressed with the princely appearance of this rare insect, and unhesitatingly accord it the first rank among its peers in the interesting group to which it belongs.

Catocalæ have been very abundant here this season. I have taken between 900 and 1000 specimens, and among them some rare species and some that I seldom or never took here before. For example, I have taken *atarah* (as has also my friend, Mr. C. Whitney, in N. H.), which I believe has not been recorded before as occurring north of Texas. I have also taken *amasia*, and a species allied to it, which may prove to be an extreme variety. This also is put down in the published authorities as a southern species. Mr. Whitney informs me he also has taken this species in N. H. this season. And now *marmorata*, which hitherto has been known only as a Californian species. I have one, and perhaps two, that I think are new species, which I may give you a description of when I get time. After a while I may also prepare you a list of the species of *Catocala* occurring here. JAMES ANGUS, West Farms, New York.

HOW DO SPECIALISTS PREFER TO RECEIVE MATERIAL?

DEAR SIR,—

Dr. Henri de Saussure writes in the introduction, page xix, to his Synopsis of "Solitary Wasps" (Amer. Wasps) as follows:

"In a great many collections it is usual to spread the wings and legs of the Hymenoptera. This is mere amateur's work, of no utility for study, sometimes even quite opposed to the purpose in view, by dissimulating the character of the insects instead of exposing it to view. This practice is to be regretted, moreover, by its increasing the value of the insects, on account of the time and expense wasted thereby, so that one is loathe afterwards to place them in the softener, when it becomes necessary to dissect the moth."

In connection with this, I would ask whether Dipterologists and Micro-lepidopterologists prefer things (to be sent to them for study) *spread* or merely pinned. Mr. V. T. Chambers is satisfied to get Tineidæ dead and dry, and even untouched by a pin. Let Mr. Cresson and other specialists announce their preferments. I should be glad to see published the names and addresses of such gentlemen as now are engaged in the study of Tortricidæ, Pyralidæ and Alucitæ, of which groups I will contribute all my accumulated Californian specimens without reserve.

JAS. BEHRENS, P. O. box 1,173, San Francisco, Cal.

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AN EXPERIMENT WITH A STINGING LARVA.

BY MISS MARY E. MURTFELDT, KIRKWOOD, ST. LOUIS, MO.

There is not in the whole group of caterpillars a more innocent and harmless-looking object than the larva of *Lagoa opercularis*—especially just previous to the fourth moult. As it reposes curled upon a leaf, with its long, wavy, white silken hairs the sport of the slightest zephyr, it resembles nothing so much as a tuft of the finest white cotton, and seems almost to invite the touch of caressing fingers. But let the unwary beware of meddling with that treacherous softness; they will find it a veritable "wolf in sheep's clothing!"

I had upon several occasions tested upon my hands the prickles of various stinging larvæ, such as *Empretia stimulea*, *Callochlora viridis*, *Saturnia io* and *S. maia*, &c., without incurring more than a temporary smart, which, if severe, could be allayed by alkaline applications, as ammonia or a solution of soda. This being the case, I did not hesitate to undertake a similar experience with the larva of *Lagoa*, and one evening suffered the larva to be struck sharply against the little finger of my right hand, between the first and second joints. I felt the prickles pierce the skin, but for some time the irritation was but slight. As the evening advanced, however, the pain became severe and was accompanied by considerable inflammation and swelling of the finger. I then thought it advisable to apply some remedy, and tried first soda and then ammonia, but without the expected relief. I next resorted to arnica and camphor and finally to acids, but all in vain; the burning pain—exactly as though I held my finger against glowing coals—seemed rather to increase than diminish, and I felt that for once I was indeed a martyr to the desire (not my own, by the way!) for experimental knowledge. A night of sleepless suffering followed, and it was not until near morning that the pain subsided. No ill consequences followed except the peeling of the skin from

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the part affected, but I have since experienced no inclination to cultivate a close acquaintance with this apparently innocent, but really formidable caterpillar.

After the last larval moult, as most Lepidopterists are aware, the larva of *Lagoa opercularis* presents an entirely different appearance from the one above described. The color is no longer white, but a dark gray, with fulvous or ochreous shadings on the dorsum and sides; the long hairs are replaced by a short and dense coating, resembling long-piled velvet, in which the stinging spines are more concealed than they were under the previous hairy coat. This larva is anomalous in one respect. It has, in addition to the four pairs of well-developed abdominal prolegs, two pairs of tubercles on joints 5 and 10, which are not only used as locomotive organs, but are actually provided with the rudiments of hooks.

THE PREPARATORY STAGES OF LYCAENA COMYNTAS.

BY W. H. EDWARDS, COALBURGH, W. VA.

Last year I observed a female *comyntas* depositing eggs upon *Desmodium Marilandicum* Gray, a common and troublesome weed in this region, called "shoestring" by the country people, from its toughness of stem, and bearing a sticking burr in the fall. On 9th July, 1876, I set a female in a bag over a stem of this plant, and several eggs were laid on the tender terminal leaves. Mr. Mead noticed that this butterfly laid also on red clover, and a number of eggs were obtained by the same process, on the 13th July, deposited on the young leaves and on the flowrets of the head. On the 12th, the eggs on *Desmodium* hatched; 15th, one larva passed 1st moult; 18th, the 2nd moult; 21st, the 3rd moult; on or about 26th, the 4th moult; made chrysalis 31st, and the butterfly emerged August 9th. I raised but one of this brood to maturity, but ten on the clover. The single larva was green in all its stages, and its chrysalis was green, but the larvæ on clover were reddish or red throughout, and their chrysalids were sordid white. Whether this difference was owing to the food plants further experiment must determine. The larvæ at first were such minute

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objects as to be almost invisible, particularly on *Desmodium*, as both larva and plant were of nearly the same shade of green. On the clover they escaped sight down among the flowrets. Only by keeping them in small wine glasses could I have saved them. On clover, the tender leaves were rapidly eaten by the very young larvæ, a single larva eating out two or three furrows the width of its body, and side by side. As they became larger they seemed to feed on the calyces of the flowrets exclusively, curving themselves to the surface of the clover head, or burrowing into it. On *Desmodium*, as there were no flowers in bloom, only the tender leaves and immature flower buds were eaten. When about to change to chrysalis the larva rested motionless for several hours, usually on the upper surface of a leaf, the green shade becoming gradually yellowish, then red, rusty brown, and a loop was thrown over the body almost mid-length. When the change had occurred, the shape and appearance of the green chrysalis was so like that of the larva as to require some inspection to discover whether it was a chrysalis or no, lying flat on the leaf, the upper side rounded and of almost exactly the larval shape. To make the resemblance still closer, the chrysalis is as hairy as is the larva. I believe that wherever *comyntas* is found, two sizes of the butterfly appear, one of scarcely more than half the superficial area of the other. I do not know of any other species in which this peculiarity is regularly found. Both forms were among the butterflies from these chrysalids. The species is also dimorphic in the female, most of this sex here being black, the others blue with broad black margins. This phenomenon is similar to that of *Pseudargiolus* in its winter form *violacea*. At Coalburgh, there must be several successive broods of *comyntas* during the season, as fresh individuals are seen every month from April to September.

I subjoin a description of the several stages:

EGG; round, flattened, depressed at top, covered with a frost work of interlaced points; in color delicate green.

YOUNG LARVA; length .05 inch; shape rather cylindrical; color yellowish, excepting a few white tuberculated points on dorsum, arranged in two longitudinal rows; a similar row at base of body; from each of all these points arises a long, curved, white hair; head nearly as broad as second segment, black, shining, retractile.

Following the larva which fed on *Desmodium:*

After FIRST MOULT; length .08 inch; onisciform, flattened, the dorsum flat at top, sloping towards base of body; color greenish; the

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whole surface irregularly dotted with black; and from most, but not all, of the dots come white hairs, those on dorsum curved back, those nearer base curved partly downward and partly back; head obovate, long and narrow, smaller in proportion to 2nd segment than at last stage, and partly concealed, even when active, in second segment; color black.

After SECOND MOULT; length .12 inch; broader and flatter than before; on each side of the narrow dorsal ridge a slightly raised edge, caused by the tubercles; at the base of the body a fold, and the hairs from this and the ridge are longer than elsewhere; whole surface finely pilose; color green, but with a rusty tint caused by the numerous reddish points; above the fold these take the form of a line or slight stripe; at this stage the division of the segments becomes distinctly apparent.

After THIRD MOULT; length .20 inch; color clear apple green, the crests of the dorsal ridge, and also the fold at base, whitish; on either side of the white line thus caused at the fold, on several of the segments after the middle, but not on the two last, is a reddish line; there is also an indistinct double oblique line of pale green on side of each segment; head as at last stage.

After FOURTH MOULT; length .36 inch, greatest breadth .10 inch; onisciform, high anteriorly, the back rounded and sloping to last segment, which is much flattened; both ends (when the head is retracted) rounded equally, or nearly so; each segment ronnded dorsally; the whole upper surface covered with fine white hairs; color emerald green with very many yellow tuberculous points; along middle of dorsum a deep green stripe in a depression; at base a whitish line edged with vinous on three or four segments after the middle; under side and legs pale green; head .025 inch in breadth, longer than broad, obovate, shining black, seen through the 2nd segment when half protracted.

CHRYSALIS; length .26 inch; greatest breadth .10; shaped much like the mature larva, rounded at each end, tapering on the sides somewhat from segments 5 and 6 to head, roundly carinated dorsally, flattened on under side; the mesonotum but slightly prominent; color emerald green, except the abdomen both above and below, which is yellowish green; a dark green medio-dorsal stripe from end to end, and on either side of this a row of small round black spots, nearly the whole length; much covered with fine white hairs; on the top and sides of the anterior segments the hairs are conspicuously longer, and are arranged in tufts, and similar hairs form a connected fringe quite round the abdomen.

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The larvæ which fed on clover differed in coloration as follows: color russet varying towards vinous, interspersed with green; at third moult some were pale green dorsally, the white being caused by the tubercles, the sides vinous; the dorsal stripe vinous, and the oblique lines vinous; others had the back as well as sides vinous, and this variation and character followed to maturity. The chrysalids of these larvae were sordid white on the whole upper surface and lower side of abdomen, the former specked with brown; the medio-dorsal stripe was brown, as were also the dots; under side of thorax and of head case, and the whole of the wing cases apple green.

NOTES ON CERTAIN SPECIES OF MOTHS.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Phyprosopus callitrichoides Grote.

Prof. Zeller published this species subsequently under the generic name of *Sudariophora*, which I, afterwards, adopted in lieu of my own. Prof. Zeller, however, now states that the generic character upon which he founded the name *Sudariophora* does not exist in reality. Accordingly, I now revert to the earlier name for the genus. The insect was erroneously identified as *Doryodes acutaria* by Mr. Walker, and referred by him to the Pyralidæ in the British Museum lists, where it is recorded as *Doryodes acutalis*. It does not seem to have been separately named before I described it. Dr. Packard discusses the position of the species in his work on the *Geometræ*, p. 33, and finds that "the palpi are truly noctuiform, as well as the shape of the wings." In criticising Prof. Zeller's classification of the moth, Dr. Packard omits to state that I had described it previously under the Noctuidæ. Consult Zeller, Beitr., 328–9.

Caterva catenaria (Drury).

The new generic name is proposed since our species is generically distinct from the European forms referred to *Zerene* Treits., a genus which,

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according to Stephens, is equivalent to *Bupalus* of Leach. *C. catenaria* occurs in the autumn in various localities in New York State and Pennsylvania, according to our observations. It flies sluggishly in the day time, and collects in numbers about clumps of bushes in fields.

Epimecis hortaria (Fabr.).

In a list of N. Am. Geometræ which I have in MSS., this name is retained instead of *Bronchelia hortaria* Guen. The name is proposed in the Verzeichniss for this and another species, the European *umbraria*, which, however, belongs to *Cymatophora (Boarmia)*, leaving the designation for *hortaria*.

Homopyralis discalis, n. s.

♂ ♀. This is a slightly larger form than *tactus*, and instead of the even brown color of that species, the wings are olivaceous and paler, contrasting with the lines and shadings, which are disposed as in its ally. The pale ground color appears on the extra basal space; the black orbicular is evident. Pale cuneiform spots accompany the t. p. line externally, as well as the black dotted terminal line. There is on the cell of fore wings, and more evidently on hind wings, a *reddish* shade beyond the stigmata. Beneath paler than in *tactus*. Exp. 26–28 mil. New York State (O. Meske; Geo. W. Peck).

Conchylis argentifurcatana, n. s.

Allied to *Ridingsana*. Fore wings olive brown with the internal margin silver striped. From the base to the middle of the wing a silver stripe runs centrally, terminating pointedly. This median stripe is joined to the costa at basal third and coalesces here with the oblique costal stripe, which runs downwardly and outwardly. The lower edge of the median stripe is produced downwardly somewhat squarely before its outer extremity. An irregular silver patch above anal angle. A minute silver dot beyond the first costal stripe. The costa at base is concolorous, not silvery. A sub-apical trigonate patch and a terminal apical discontinued silver band. Hind wings and abdomen fuscous, with paler fringes. This species differs from *Ridingsana* by the shape of the median stripe, which bulges downwardly at about the middle of the wing and sends a branch upwards to costa, coalescing with the oblique costal stripe. Two specimens, from W. Saunders, London, Ont.; taken at Port Stanley, Ont. Expanse 1.55 inch.

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Conchylis hipeana, n. s.

Allied to *argentifurcatana.* Ochreous brown; the silver markings rather distinctly outlined in black. Internal margin striped with silver. Before anal angle a silver dot. Median stripe as in *argentifurcatana,* while the inferior bulged prolongation is wider, preceded by a notch of dark scales. An irregular silver patch above anal angle. Costa at base with a silver stripe terminating before the usual oblique costal stripe. A silver spot between this latter and the usual sub-apical trigonate patch. A terminal apical discontinuous silver band. Hind wings and abdomen pale fuscous with whitish fringes. This species differs by the costa being silvery from the base outwardly and by the median stripe not being joined to the first oblique costal stripe by a furcation. One specimen, from W. Saunders, London, Ont.; taken at Port Stanley, Ont. Expanse 1.55 inch.

Eustrotia caduca, n. s.

Among the species of Noctuidæ which I have recently been able to examine is a species of *Eustrotia* reared by Prof. Kellicott from larvæ feeding on the Yellow Pond Lily *(Nuphar advena),* and which I propose to call *Eustrotia caduca.* At first sight it looks like a very large *E. apicosa* (= *nigritula* Guen.), but the differences in ornamentation are at once perceivable on comparison. The colors and their disposition are similar. From the base to the t. p. line the wing is purplish brown, deepening outwardly in tone. The t. a. line is waved. Both stigmata are perceivable, the reniform rather large and quadrate, not oblique as in *apicosa;* they are leather brown in color, as is the terminal portion of the wing beyond the t. p. line. The shaded subterminal line is indented opposite the cell. The fringes are blackish, checkered with leather brown. The hind wings are fuscous, shaded with brown, and with double, faint mesial lines. Head and thorax leather brown. Beneath brighter brown with black discal mark on hind wings, double lines, the disc of the fore wings blackish. The moth expands 28 m. m. Hab. Jackson Co., Michigan.

Selenis monotropa, n. s.

Two fresh specimens, similar in appearance, but evidently of opposite sex from the structure of the frenulum. The male has not the hind tarsi covered with thick scales; but the fore legs are thickly covered with blackish hair, concealing a pale tibial tufting. Wings brownish black with a broad gray costal margin to the fore wings, widening to the base

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of the wing, where it attains internal margin, and spreading across the hind part of the thorax. It is darker shaded, somewhat brownish anteriorly. Collar dead black. The black lines are indicated on the gray costal margin. Orbicular a minute dot. Reniform strongly indicated, sur rounded with the pale shading of costal margin. T. p. line continuous, reddish brown where it crosses the gray margin, and here angulate, black below and strongly marked, a little dentate. Subterminal line followed by an interrupted reddish brown shading. Terminal line black, festooned, followed by a pale thread-like line at base of fringes, which latter are blackish. The denticulate black t. p. line continued across hind wings, which agree with the primaries. Over the middle of the wings are two or three blackish shade lines representing the median shade and t. a. line. Beneath a little paler, with small discal marks, white centered. Feet dotted with white; abdomen blackish. Expanse 31 mil. Hab. Bastrop Co. (O. Meske).

This species seems to be allied to *Selenis lanipes* Guen., of unknown locality. It appears to differ decidedly in color, the continuous black transverse posterior line, and the absence of the multitude of parallel, denticulate, unequal violet gray, reddish and black lines, crossing the wings in *lanipes*. There is also the absence of any sexual character in the clothing of the hind tarsi, unless I have made a mistake in my determination, which, after re-examining both hind wings, I think is not the case. The "ligne coudeé" is, instead of being continuous and evenly strong as in *monotropa*, "indiqueé par des traits noirs plus épais, fondus inferieurement," in *lanipes*. Gueneé's figure represents a similarly sized but much higher colored insect than the one I describe, and I do not think there is any reasonable doubt that they are different species.

NOTES ON THE OCCURRENCE OF ARGYNNIS IDALIA DRURY.

BY H. H. LYMAN, MONTREAL, P. Q.

Mr. W. H. Edwards, in his article on *Argynnis myrina*, published on page 189 of Vol. vii, of the CANADIAN ENTOMOLOGIST, says that in all the species of butterflies which he has made observations on, except *Apatura clyton*, the females emerge as early as the males, and in the course

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of the same article he mentions having "bred from the egg four of our larger species of *Argynnis*, viz., *diana*, *cybele*, *aphrodite* and *idalia*."

Does *A. idalia* occur in Mr. Edwards' neighborhood, and to what extent has he obtained the imagines from eggs? The only other reference by him in the CAN. ENT. to *A. idalia*, that I can find, is on page 151 of Vol. vii, where he states that Mr. G. M. Dodge had sent him several eggs of this species from Nebraska, and that he had succeeded in carrying a few of the larvæ through the winter and one past the fifth moult, but that this one *died before chrysalis*.

Though I do not presume to question the statements of so distinguished an Entomologist as Mr. Edwards, I thought that I would give my experience with regard to this butterfly, and I should like to know whether any one else has had a similar experience.

I may state that I have collected for eight successive summers on Cape Elizabeth, in the vicinity of Portland, Me., where this butterfly occurs every season, and though generally not common, is sometimes somewhat plentiful.

My experience has been that, though I might find a stray female almost as early as the males, the great majority of females did not appear for a week or ten days after the males. It is only within the last three years that I have kept an entomological diary and numbered my specimens, so that I cannot give any figures with regard to those taken or observed before 1873, but I remember noticing the fact previous to that date; however, this species was tolerably abundant during the past season (1875), and I can give some dates in support of what I say.

By referring to my journal for this year, I find that I took the first ♂ of the season on 20th July, three more on July 24th, on which day I also caught one ♀, and from July 20th to 31st I took altogether 10 ♂ and 1 ♀. Unfortunately the weather during the first half of August was very bad, almost every day being foggy or rainy, or both, so that I am unable to state when the females emerged.

On one partially fine day, Aug. 9th, I obtained another ♂, and during the last half of August worn females were obtainable, but they were too poor for cabinet specimens.

In 1874 this species was very scarce, and I only obtained two specimens, ♂ on July 28th, and a badly rubbed ♀ on Sept. 3rd.

In 1873 it was also scarce and I only took two ♂, one on July 16th and another on the 17th. Of course the cases of 1873 and '74 would

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not prove anything, as the number taken was so small, although the last two dates are a good deal earlier than I ever remember to have seen a female, but I consider that the captures of the past season afford strong evidence in favor of the opinion that the males of this species appear at least a week or ten days before the females.

ANNUAL ADDRESS OF THE PRESIDENT OF THE ENTOMOLOGICAL SOCIETY OF ONTARIO.

To the Members of the Entomological Society of Ontario:

GENTLEMEN,—In accordance with time-honored usage, it devolves upon your retiring President at the close of another year of the existence of our Society to offer you a few remarks bearing upon the objects and interests of our body, or of Entomology in general.

And first, gentlemen, I desire to congratulate you on the continued prosperity of our Society and the increasing interest felt and manifested in the furtherance of the chief objects we as an organization have in view, viz., the diffusion of practical information in reference to the life history and habits of our insects, so that we may be able to distinguish our friends from our foes, and thus be placed in a position to apply intelligently such remedial measures for the check of insect ravages as experience may suggest to be most practical and effective.

During the past year circumstances have arisen which have brought our Society more prominently before our people than ever before, notably the fact of the accumulation of that grand collection of Canadian insects which we have prepared and forwarded to the Centennial Exhibition in Philadelphia. My esteemed predecessor, in his annual address last year in Toronto, referred to this proposed work, and expressed himself as confidently anticipating the active co-operation of our members in all sections of our country. The result has more than realized our fondest hopes; our members entered most heartily into the work, bringing together a collection of Canadian insects far surpassing anything ever before seen. The carrying out of the details of this work was entrusted last year to a special committee, consisting of Messrs. Bethune, Saunders and McMechan, and upon consultation it was resolved to accumulate all

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the material for this collection at the Society's headquarters in London, and there make such selections from the insects sent as might seem desirable. All our members in London who had collections freely placed them entirely at the disposal of the committee, while many of those resident in other localities throughout the country expressed their readiness to contribute anything or everything in their power to fill up blanks in the desired series of specimens.

As is usual in such cases, the bulk of the work of arranging, classifying and labelling specimens fell upon a few individuals. It affords me much pleasure to have the opportunity of naming especially *one* who has labored most assiduously and has contributed more than any other person towards the success of this enterprise; I allude to my esteemed friend, Mr. Johnson Pettit, of Grimsby, who arranged the entire collection of Coleoptera and freely contributed from his own stores—the accumulation of years—a large proportion of the specimens. The extreme neatness and care manifested by him in the mounting and arrangement of the insects has been the admiration of all, and some idea of the accuracy of his determinations may be arrived at when I say that such authorities as Dr. Horn and Dr. LeConte, of Philadelphia, after a critical scrutiny of the whole series of Coleoptera, filling some twenty-seven cases in all, could only detect two or three errors, and these among the smallest and least conspicuous specimens; such results reflect great credit on the labors of our esteemed coadjutor. In the arrangement of the other departments, your President was ably aided by several gentlemen, notably Messrs. E. B. Reed, J. M. Denton and G. Geddes, of London; indeed, all our London members were ever ready to render all the assistance in their power.

The expenses necessarily attendant on this work have been considerable. The making and lining of suitable cases in which to display the insects, the printing of labels, &c., and the numberless outlays entailed by the transmission of specimens to and fro from all parts of the country, as well as many other incidentals which it is needless to enumerate here, combined, have involved a large outlay. This has been chiefly met by a special grant of five hundred dollars from the Government of Ontario, the remainder being drawn from the Society's resources.

To make the collection as perfect as possible, as far as accurate naming is concerned, the doubtful specimens in the orders most largely represented were submitted to the examination and correction of specialists. The entire collection of Lepidoptera was carefully gone over by Prof. A.

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R. Grote, of Buffalo, who generously placed his services at the disposal of the Society for this purpose, and twice visited London in order to complete the work. Dr. Horn also kindly rendered all possible aid in the determination of such Coleoptera as were submitted to him, and to Dr. A. S. Packard we are indebted for naming some of the Geometridæ.

The collection arrived safely and in good condition in Philadelphia, where it at once attracted much attention. The whole display consisted of eighty-six glass cases, forty-five of which were filled with Lepidoptera, twenty-seven with Coleoptera, and the remaining fourteen occupied by the other orders, the whole arranged in a double row on a suitable stand *seventy-six* feet in length, in the Canadian Department in Agricultural Hall.

There were no other collections on exhibition in Philadelphia which would compare favorably with that sent by our Society. There was a very good one in the United States Government Building, from the Department of Agriculture in Washington, arranged by Prof. Townend Glover; this, however, consisted chiefly of Lepidoptera.

There was a small collection shown in the Canadian Department, adjoining that of our Society, consisting of four or five cases, containing Canadian insects representing the various orders; they came, I believe, from Montreal, but I did not succeed in finding the name of the party to whom they belonged. Through the neglect or carelessness of our Canadian Commission, neither this collection nor that of our own Society *are mentioned* in the official catalogue, do not appear to have been entered as belonging to any department of the exhibition, and hence were not examined at all by the Centennial judges. Had it been otherwise, we should no doubt have been honored with awards which, in the case of our Society, if we may judge from the laudatory comments of those best able to form an opinion, were well deserved.

In the Kansas State Building there was a collection from the State Board of Agriculture arranged by Prof. Snow, consisting of thirty cases, sixteen of Ledidoptera (seven of butterflies and nine of moths), five of Coleoptera, two Neuroptera, two Orthoptera, three Hymenoptera, one Diptera and one Hemiptera. These were very well set up, classified, and nearly all named, and were very creditable to Prof. Snow and the Board by whom they were sent. There was, nevertheless, one drawback to viewing them with any satisfaction; the dust was allowed to accumulate on the glasses to such an extent as to obscure the objects contained.

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There was a collection from Brazil, shown in the Brazilian Department in the Main Building. This, we were told, was the work and property of a private gentleman residing in Rio Janeiro; it was arranged in thirty-five cases, thirty-one of which were Coleoptera and four Lepidoptera. This collection was very much mixed; there was no attempt made to name the insects, excepting to the extent of partially indicating the family names. Neither was there much effort towards a correct classification; they seemed to be partly arranged with regard to their natural relationships and partly with the view of display. Among the butterflies and moths there were some superb specimens whose brilliance attracted much attention. There were also some very beautiful and interesting things among the Coleoptera. The Curculionidæ were very brilliant and numerous in species, with forms greatly varied; the Cerambycidæ were also remarkable, handsome, and largely represented, some of them of great size. We noticed one enormous *Prionus* fully six inches long; the *Cetonias* were also very beautiful. Some of the Buprestidæ were wonderfully brilliant with metallic shadings, and the Chrysomelidae very numerous and some of them very charming, the Cassidae being largely represented. Among the Scarabeidae there were some enormous specimens, among others, species of *Copris* with remarkable horns, and some brilliant species of *Onthophagus;* there were also a number of very handsome *Elaters.* One of the rarities in this collection was a fine example of *Hypsaphalus armatus,* an extremely rare insect about two inches in length, and of which it is said there are only two or three known specimens in collections. The more brilliant Brazilian insects, especially the Coleoptera, are largely employed by the inhabitants of that country in the ornamentation of jewelry and other fancy articles, often associated in the latter case with the feathers from their brilliant plumaged birds.

In the Department of Queensland there was a large case, filled chiefly with Lepidoptera in a fine state of preservation, embracing many very beautiful and strange looking things; almost the only familiar objects among them were specimens of *Danais archippus.* In this instance, also, none of the specimens were named, which detracted greatly from the interest which would otherwise have attached to them. We learned that this collection had been sold for $150 to Mrs. Bridgham, of New York, a lady who, we believe, takes a deep interest in Entomology and who has a very large and handsome collection of Lepidoptera.

The Orange Free State of South Africa exhibited two cases of insects,

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among which there was a curious admixture of millipedes, scorpions and spiders, arranged in a semi-ornamental manner. One case contained chiefly Coleoptera, with a few Hymenoptera, Hemiptera and Orthoptera. Among the Coleoptera there were some curious and beautiful forms, especially among the Cetonidae and Cerambycidae ; also some handsome Scarabeans, Chrysomelans and Curculios. The second case was filled mainly with butterflies, among which there were a few very handsome ones. That cosmopolitan species, "the painted lady," *Cynthia cardui*, was represented by several specimens ; there was also a *Sphinx* closely resembling the deaths-head moth of Europe, and a *Utesthesia* very like our *bella*. Besides these there were a number of very curious and handsome moths, with a few Orthoptera and Neuroptera. No attempt was made in the way of naming anything in this collection, nor any effort at classification.

An American gentleman, whose name I did not learn, had a very curious exhibit of insects in Agricultural Hall, of a purely ornamental character, in three cases. One was a circular arrangement, and was built up chiefly with butterflies and moths ; the other two represented public buildings and were constructed of beetles ; the specimens were immensely numerous and well preserved ; the whole arrangement indicating great ingenuity and perseverance on the part of the collector.

India had a very fine exhibit of silks, raw and manufactured, with the insects and cocoons from which they were obtained. The Tusseh silk-worm moth, *Antherae paphia*, is very handsome, not unlike our *polyphemus ;* the cocoon is egg-shaped, and yields a very strong looking silk. The *Bombyx Huttonii*, or wild silk-worm moth, is also very pretty ; in form it resembles *B. mori*, but its wings are beautifully marked and tipped with brown.

It was very gratifying to observe the prominence given to the study of Natural History in the Educational Departments of many of the nations thus represented at the Centennial. Nearly all of them had small collections illustrating the course of teaching in this branch of study, and in nearly every instance Entomology occupied a prominent position. In the model schools of Sweden and Belgium this was very noticeable ; also in the Russian exhibit, where there were cases of insects of all orders, including in many instances the blown larvae very neatly set up. In the same department in the Japan exhibit there were similar cases fairly classified, illustrating the various orders. The Chinese make use of

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insects, too, but with them they are used as medicines; among their *matera medica* collections we observed dried caterpillars, the empty pupa cases of a species of *Cicada*, and other similar substances, all extolled as possessing rare medical virtues.

The bringing together of such an immense number of agricultural productions as are now on exhibition in Philadelphia, including almost every variety of grain, peas, beans and other useful productions on the face of the globe, affords a favorable opportunity for the introduction of any insect pests which may infest these articles in the country of their growth; these, if introduced and acclimatized, may attack similar or related products in this country, unless precautions are taken against their dissemination, and thus we may have new foes to fight which may be very difficult to contend with. The American Centennial Commission, who do not seem to have overlooked anything, have, with wise foresight, appointed a special Commission of eminent Entomologists to report on the insects introduced along with the products exhibited. This report will be looked forward to with much interest by agriculturists as well as Entomologists.

The Agricultural Building, in which our insects were shown, was well supplied with skylights, which admitted a flood of light on everything below. Exposure to this brilliant light for so many months has had a damaging effect on the colors of some of our Lepidoptera, the moths being much more faded than the butterflies; this fading is especially noticeable in insects having any red colors on their wings, such as the Catocalas and Arctians; many of these, however, can be replaced without much difficulty.

Suitable arrangements have been made for the careful packing and re-shipping of the insects at the close of the Exhibition, when they will be forwarded to the Society's rooms in London, Ont. Here it is proposed to keep the collection as far as possible undisturbed, where it will serve a good purpose as a collection of reference for collectors to name their specimens from. Mr. Pettit has kindly consented to allow all that he has contributed to remain in the Society's rooms, and all the London members will follow his example. Mr. Wm. Couper, of Montreal, has generously donated all he has sent to the Society, and I doubt not that most of our other friends in Montreal and elsewhere, who have contributed to the collection, will allow such of their insects as are not represented in our cabinets in London, to remain at least for a time, when no doubt most of them could be replaced. The advantages which will result to our

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Society from the possession of a collection so well worked up and so correctly named, can scarcely be over estimated, affording as it will conveniences to collectors for naming specimens such as we have never had before. If for no other reason, we shall, in the possession of these advantages, always have cause to remember with pleasure the hundredth anniversary of American independence.

The continuance of the organ of our Society, the CANADIAN ENTOMOLOGIST, has also contributed greatly to the maintenance of the interest felt in our Society. During the past year important matters have been discussed in its pages, and a mass of new facts, throwing light on the habits and life history of many of our insects, placed before our readers. Much space has also been given to the important department of descriptive Entomology. Indeed, I scarcely think we should be deemed presumptuous in saying that our little journal is an important bond which does much to bind together the brotherhood of Entomologists throughout America.

The recent action of American Entomologists on the subject of Entomological nomenclature claims more than a passing notice. At the meetings of the Entomological Club of the American Association for the Advancement of Science, held last month in Buffalo, N. Y., this important subject was discussed and conclusions reached in reference to it which, I hope, will greatly tend to the stability of our nomenclature, the great end and aim which all parties claim to have in view. Amidst the conflicting opinions held by leading Entomologists on this subject, it was scarcely to be expected that entire unanimity could be secured; but it was most gratifying to notice the conciliatory spirit manifested by all, and the desire apparently as far as possible, to meet each other's views. A series of resolutions touching on important points was presented by the committee named last year to report on this subject, and on some of these they were unanimous, while on others there was a divided opinion. Those rules which were unanimously adopted will, it is understood, be strictly carried out by all who were present, while those on which there was expressed a divided opinion will, in the meantime, be left to be acted on or not, as the individual choice may dictate. Although this does not leave the subject in as satisfactory a state as entire unanimity would have done, still it was felt that by the action taken very much had been done towards settling some of the disturbing elements which interfere with the fixity of nomenclature. A report of these important meetings will be found in the

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ENTOMOLOGIST; we commend them to the careful perusal of our readers. Our own Society was well represented in this gathering by the presence of the Rev. C. J. S. Bethune, M. A., E. Baynes Reed and your President.

I shall not attempt, gentlemen, to trespass longer on your time and patience. Thanking you for your kind partiality in electing me to fill so important an office among you,

I have the honor to be very sincerely yours,

WM. SAUNDERS.

London, September, 1876.

TINEINA.

BY V. T. CHAMBERS, COVINGTON, KY.

LITHARIAPTERYX, *gen nov.*

L. abroniæella. N. sp. (Or, as it may be popularly translated—the delicate little gem-wing, or gem-wing of the *abronia.*)

This insect is interesting not only for the elegance of its adornment, but equally so for the relation it bears to other genera of the *Glyphipterygidæ.* Comparing it with *Glyphipteryx fuscoviridella, G. thrasonella, Æchmia dentella, Perittia obscuripunctella,* and *Tenagma serriciellum,* its relationship to them may be thus stated: Lacking some of the characters of each genus, it combines many of each. Like *Tenagma* and unlike the others, it has the submedian vein of the fore wings not furcate at the base; the form of wings is almost exactly as in *Æchmia,* but not quite so wide, and the tuft of scales projecting from the hind margin in *Æchmia* is absent; the neuration of the fore wings is almost exactly as in *Æchmia,* except that, as above stated, the submedian is simple in this species, and there *is a distinct secondary cell* as in *Glyphipteryx.* The neuration of the hind wings resembles that of *Tenagma,* the cell being unclosed, but this species has the submedian furcate on the margin and two independent discal veins going to the hind margin, instead of one, as in *Tenagma* (or it would resemble the neuration of the hind wings of *Æchmia* if the discal vein, the submedian and the first branch of the median were absent in that genus.) The characters of the head and its appendages are very

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nearly as in *Perittia*, but this insect has the tongue longer and scaled at the base only; as in *Perittia*, there are no ocelli, and no maxillary palpi, the labial palpi (recurved in the living, porrected or drooping in the dead insect) do not over-arch the vertex, but reach only about to the base of the antennae, and taper gradually from the base to the apex, with the articulations indistinct; the antennae are simple, rather slender, and a little more than half as long as the wings. The ornamentation, though quite distinct from all other *Glyphipterygidæ*, yet reminds one of *Glyphipteryx* by the smooth elevations of violaceous metallic spots, and of Dr. Clemens' genus *Hybroma*, by the dark streak along the base of the costa. Thus the head and its appendages ally this species to *Perittia*; the wings to *Æchmia*, and less closely to *Tenagma*, while the secondary cell of the fore wings and the ornamentation ally it more remotely to *Glyphipteryx*; the characters of the larva also ally it to *Glyphipteryx*, but the larvae of the other genera mentioned above are unknown.

Palpi, head and antennae like polished silver, the antennae annulate with brown; fore wings appearing to the unaided eye silver gray as far as the ciliae, and the apical portion ochreous or golden, according to the light, but under a lens the silver gray portion is resolved into a multitude of narrow wavy lines, alternately white and black, which cross the entire breadth of the wing; the costal margin from the base to about the basal fourth is velvety black, interrupted by two smooth metallic violaceous streaks, nearly perpendicular to the margin and appearing to be raised a little above the surface, and there is another on the extreme base of the costa which is almost concealed by the patagia (or instead of this, we may say there are three metallic violaceous spots, each widely margined by velvety black, the posterior black margin of each confluent with the anterior black margin of the succeeding one); a *very little* further back and still before the middle of the wing length, is another velvety black spot (the fourth, counting the one on the base), containing another metallic violaceous spot, and nearly opposite to this, but a little further back, is a velvety black dorsal spot, containing also a metallic violaceous spot, and further back on the costal margin, behind the middle, are two spots of smooth violaceous metallic raised scales, *not* margined with black, and opposite to the space between them, just within the dorsal margin, near the end of the cell, is another one also unmargined, and on the margin beneath it is a *small* white spot. In some lights all of the metallic violaceous spots appear simply white, and in the golden ochreous

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apical part of the wing is a triangular white costal streak pointing obliquely *forwards* and ending in a small violaceous metallic spot. There are thus seven costal spots (including the one on the base), and two dorsal ones, the second dorsal being very small and white, and pointing to the infra-dorsal violaceous spot. Ciliæ fuscous, with a white line extending along the base of those of the dorsal margin. Hind wings purplish fuscous with long white ciliæ. Under surface of both pair purplish fuscous, with the three white costal streaks which are nearest to the apex showing through the wing. Upper surface of the abdomen shining black, each segment margined posteriorly with white; under surface silvery white, each segment narrowly margined anteriorly with black; anal tuft silvery white. *Al. ex.* 5 lines. Edgerton, Colorado; alt. over 6,000 feet.

The imago may be found in the afternoon in July, flitting about in the brilliant sunlight of that region, and alighting on the grass, or on the stalks of *Abronia fragrans*, which is very abundant, filling the air with its rich and delicate, though to me somewhat sickening, fragrance. (The statement in Prof. Gray's "School and Field Book of Botany," that the flowers of *A. fragrans* 'open at sunset' is incorrect, so far as I observed the species, as I have usually found the flowers fully open at all hours of the day. It is, however, more fragrant in the afternoon and evening, but I have never found the flowers frequented by any insect, otherwise than by an occasional visit from a small *Andrena*.) I never saw the species just described upon or in the flowers at any time. The larva resembles that of a *Glyphipteryx*, and mines the leaves of the *Abronia*, as I am fully convinced, though I did not succeed in rearing it, as all my specimens died after becoming pupæ. The moth and its larva are quite common. In twenty-five captured specimens I find no variation. The mine is irregular in shape, and the frass is ejected *usually* from the under side of the leaf, and sometimes there is a slight web on the outside of the leaf. It frequently abandons its old mine and constructs a new one, and once in confinement a well grown larva sewed two leaves together and fed upon them, though I never knew it to feed in this manner except in the breeding jar. It spins its cocoon in the sand. It is one of the prettiest of our 'Micros.'

BLASTOBASIS, Zell.

(HOLCOCERA, Clem).

B. gigantella. N. sp.

White; microscopically dusted with fuscous scales, and the course of

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each vein of the fore wings distinctly marked by a fuscous line on the upper surface, so that the neuration is distinct without denuding the wings; abdomen creamy white, with a narrow transverse brown line on top of each segment, just before its hinder margin. *Al. ex.* 15½ lines; probably greater than that of any other species belonging to the Tineina. It is the only species in this group, observed by me, which seems to conform to the law said to be found among other insects and birds of increase in development of peripheral parts in the West. It seems to be a very local species, and of very sluggish habits. I met with it only once, but then found about twenty-five specimens mostly *in coitu.* They were all found resting on the blades of the soap weed, as it is popularly termed in Colorado *(Yucca)*, and would require to be thrown violently off from the blade before they would move, but were very active on the wing when once aroused. All of them were found within an area not over one hundred feet square, in a field of about twenty-five acres, and I never saw it elsewhere. This field is on the road to Monument Park, about three miles north of Colorado Springs. The larva will probably be found to feed in some way on the *Yucca.* At all events, there was very little else in that particular locality on which it could feed. The wings are rather narrower in proportion to their length than in other species of the genus.

CORRESPONDENCE.

PARASITE ON SAMIA CECROPIA.

DEAR SIR,—

I have this fall obtained upwards of a dozen examples of *Ophion macrurum* from cocoons of *Telea polyphemus* gathered about Oct. 25th and later. Is not this unprecedented?

I have a record from hearsay, but well authenticated, of two cocoons of *Samia cecropia* emerging the *second* summer.

I found late in October *cecropia* cocoons of this year's make, from which some parasite unknown to me had emerged, either through the loose end or through a round smooth hole bitten out of the cocoon, about the diameter of an ordinary lead pencil. The remains in the inner cocoon were mostly small fragments of blackened larval skin, and in one case the entire back of the larva very neatly cleaned. Can any one enlighten me as to the character of this parasite, which is evidently of unusually large size and power. C. E. WORTHINGTON, Chicago, Ill.

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The Canadian Entomologist.

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NOTES ON CANTHARIDES.

BY THE EDITOR.

Read at the Recent Meeting of the American Pharmaceutical Association in Philadelphia.

The fact that we have in America several species of Cantharides, as well as some other closely allied vesicating insects which might at any time be used as a substitute for *Cantharis vesicatoria* (the Spanish beetle), has long been known. The species, however, to which attention has heretofore been chiefly drawn are some of the smaller ones found in the more northern parts of the country, especially *Epicauta (Cantharis) vittata* and *cinerea*, while the larger species south and west have been almost overlooked. The northern species referred to compare very unfavorably in size with the European *vesicatoria*, a feature which adds to the cost of collecting them; it would also appear that this difference of size has often carried with it the impression of a corresponding inferiority. Another bar to their successful inrroduction has been found in their color. By a strange miseonception the presence of the brilliant green particles of the wing-cases in the powdered imported insect, has been associated with their activity, and any sample of powdered cantharides or of prepared emplastrum, where these brilliant particles are wanting, would by many physicians be at once condemned. The recent introduction of the Chinese beetle *Mylabris cichorii* has done much to remove the latter objection; still, notwithstanding that it has been shown by Prof. Maisch (see Proc. Am. Pharm. Assoc., 1872) that the *Mylabris* is much stronger than *vesicatoria*, yielding, according to his analysis, fully double the quantity of cantharidin, the relative market price of the insects belonging to the two species indicates that popular prejudice still favors the use of *vesicatoria*. Our *vittata* and *cinerea*, when powdered, nearly resemble the *Mylabris* in color.

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In the western and southern portions of this continent we have species which are large and abundant, and which there is every reason to believe possess all the activity we need, and the chief object of this paper is to draw attention to this fact, and if possible to acquaint our members with the appearance of these species, and detail their life history and habits as far as they are known, so that those who reside in these more distant regions may be induced to collect them in sufficient quantities to admit of their being thoroughly tested. It is not probable that they would be found in any respect less valuable as vesicating agents than the Spanish beetle.

Through the kindness of Dr. George H. Horn, of Philadelphia, whose extensive contributions to our knowledge of American Coleoptera have made his name familiar both in Europe and America, we have been supplied with much information in reference to the species here treated of; an acknowledgment is also due to Prof. C. V. Riley, State Entomologist of Illinois, for some valuable notes on the habits of these insects. We have also had a lithographic plate prepared by Messrs. Sinclair & Sons, of Philadelphia, under the kind supervision of Dr. Horn, in which each of the species referred to is figured of the natural size, excepting 7 and 8, which are somewhat enlarged. This plate is remarkably well executed, and is probably one of the best plates of Coleoptera ever published; besides the American species, it contains figures of *M. cichorii* and *C. vesicatoria.*

We shall first enumerate the species, giving brief descriptions, as plain and void of technicalities as possible.

1. *Meloe angusticollis* Say.—This insect (see fig. 1 on plate) is of a dark bluish violaceous color, with the head, thorax and wing-cases thickly punctured with minute dots or impressions. The thorax is slender, narrower than the head; feet slightly hairy, with the spines of the legs reddish. Found in the Eastern States and in many parts of Canada; occasionally abundant under stones.

2. *Cysteodemus armatus* Lec.—Entire body bluish black; thorax with a strong lateral spine on each side; wing-cases very convex, and much larger than the abdomen, which they cover, and with very coarse elevated reticulations on their surface. This insect varies greatly in size; the figure represents a medium sized specimen.

Extremely abundant in Arizona and the desert regions of California wherever the greasewood, *Larrea Mexicana*, grows. This insect is not as

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good a vesicant as some others; the proportion of hard tissue in its structure is large as compared with the softer and more active portion, too large, perhaps, to admit of its being of much value.

3. *Mylabris cichorii* Linn.—All parts of this insect are black, excepting the wing-covers, which are of an obscure yellow, with three transverse, black, irregular, undulating bands, the one at the apex broadest. The first band is sometimes interrupted, and occasionally reduced to three or four spots.

Found in abundance in the southern portions of China, and also throughout India, on the flowers of the wild chicory and other composite plants. It is also said to occur in southern Europe, extending from Italy through Greece and Egypt to China. For further details in reference to this insect the reader is referred to an interesting and valuable paper by Prof. Maisch, in the volume of Proceedings for 1872, p. 246.

4. *Macrobasis albida* Say.—All parts of body black, densely covered with minute greenish or yellowish-white hairs. The thorax is slightly longer than wide, the wing-covers broader than the thorax, becoming wider behind, and are densely punctured.

Abundant in Texas, New Mexico and on the plains.

5. *Macrobasis atrivittata* Lec.—Also black; form more elongated than *albida;* head thickly clothed with fine black hairs, with a small white space in front of the eyes; thorax with grayish hairs, with a large black space in the middle; the wing-covers have black hairs, and their apex and sides are margined with gray; there is also a moderately broad grayish stripe extending from the humerus to near the apex.

Found in Texas, and is probably quite abundant, but we have not been able to obtain definite information on this point.

6. *Macrobasis segmentata* Say.—This insect is black also, with the segments of the body beneath margined with whitish. The thorax is nearly as broad as long, and its posterior edges are grayish. Wing-covers finely punctured and sparsely covered with short black hairs.

Occurs with *M. albida*, and is also abundant.

7. *Epicauta vittata* Fab.—The head of this species is of a light reddish color, with darker spots; antennæ black; thorax black, with three yellow lines; wing-covers black margined with yellow, and with a yellow stripe down the middle. Abdomen and legs black, covered with grayish hairs.

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Is found throughout the United States and Canada, but more abundant northward and westward of the Carolinas, extending to near the base of the Rocky Mountains. In the south it is replaced by *lemniscata*, a species closely resembling *vittata*, but differs in having another white stripe. This species has been tested, and has been found fully equal to *vesicatoria* as a vesicant.

8. *Epicauta cinerea* Forster.—Black, closely punctured, and clothed with grayish hairs; beneath clothing dense, upper surface variable. Head sparingly hairy. Thorax densely punctured, sometimes entirely covered with gray hairs, often with a large triangular central space black, divided by a grayish line along the middle. Wing-cases finely punctured, and either entirely grayish or margined with grayish all around.

Occurs all over the United States east of the Rocky Mountains, and in many parts of Canada. In the Southern States it becomes larger, with the wing-cases entirely gray; fully equal in strength to *vesicatoria*.

9. *Cantharis vesicatoria* Linn.—Color, above and below, a beautiful shining golden green; head, thorax and wing-covers closely punctured; antennæ black.

Found most abundant in Spain, Italy and the south of France; also found in all the temperate parts of Europe, and in the west of Asia.

10. *Cantharis vulnerata* Lec.—Body black; head orange yellow, sometimes with a broad black stripe down the middle; wing-cases black.

Extremely abundant throughout the entire Pacific region west of the Sierra Nevadas. Dr. Horn has seen bushels of this insect in some localities literally strewing the ground; also very common on a species of *Baccharis;* he has experimented with them and found them powerfully vesicant, and producing strangury very readily when taken internally in the form of tincture.

11. *Cantharis Nuttalli* Say.—Head deep greenish or golden green; antennæ black; thorax golden green with a polished surface, and a few small scattered punctures. Wing-cases golden purple, striped with green. Body beneath green, polished; thighs purplish, feet black. This large and beautiful insect is extremely abundant in Kansas and Colorado.

12. *Pyrota mylabrina* Chev.—Entire body and legs dull ochre yellow. Thorax with two, sometimes four black spots; wing-covers with three transverse black bands, divided in the middle by the suture, the anterior one being sometimes further divided into four spots; knees and feet

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black. Found from Kansas to Mexico, and is abundant throughout the whole region.

13. *Tergrodera erosa* Lec.—Body and legs black; head and thorax reddish, the former with a deep groove; wing-covers bright yellow, their surface roughened with coarse reticulations, with a median and apical black band, which in some specimens are wanting. Abundant in Southern California and peninsula of Lower California, on a low herbaceous plant with a blue flower.

In all these species the female is more valuable than the male, especially when well distended with eggs, owing to the relatively larger proportion of the soft parts. Eggs have the same power as the other soft parts; the blood Dr. Horn believes to be more active than any other portion.

Having referred in detail to the perfect insects, it is now proposed to sketch their history as far as known through the earlier stages of their existence.

The life history of *Meloe*, which has been well worked up in Europe, may be taken as a type of all the species mentioned, since all the facts accumulated on this subject point to a similarity in the character of the transformations and habits, which in the vesicating insects are very remarkable.

In the 20th volume of the "Linnean Transactions" there is a memoir on the natural history of *Meloe*, from which many of the following facts are derived.

The *Meloe* beetles, when fresh from their pupa cases in spring, are feeble, move slowly, and have their bodies small and contracted, but after feeding a few days these enlarge greatly, the abdomen of the female expanding to twice its original size owing to the enormous quantity of ova within its body in process of development. The abdomen will then measure an inch or more in length, and appears to be dragged along with difficulty. They are fond of basking in the hot sunshine, and are said to be most active during the early and middle parts of the day. When confined in boxes for the purpose of observing their habits, it is necessary to expose them much to the sun and supply them with an abundance of food; they are then quite at home, and their proceedings may be easily watched. They drink freely of water and require their food to be well wetted. In a few days after leaving their winter quarters they pair.

The eggs are deposited in the earth. A small excavation is made by the female, sometimes as much as two inches in depth, into which, when

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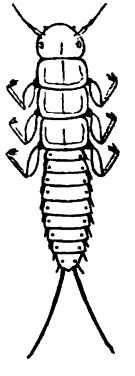
finished, she projects her body with the head just perceptible at the entrance. After remaining in this position ovipositing for about two hours, the body is withdrawn and the earth raked with her feet into the hole until it is entirely closed. These burrows are commonly made among the roots of grass in a dry soil and a sunny spot, often on the margins of a dry footpath. The female always deposits two and sometimes three or four separate layings of eggs, at intervals of from two to three weeks. The first is always the most abundant, amounting usually to three or four thousand. After each deposit the abdomen seems to be almost entirely emptied; the insect then feeds voraciously, and fresh ova are soon developed.

The eggs when first deposited are about one-twentieth of an inch in length, slightly conical, obtuse at both ends, and of a bright orange color. They are placed in such a way that they may be parallel to each other, and adhere together at their sides, with one end directed to the entrance of the burrow. The duration of the egg stage is greatly influenced by temperature, averaging from four to five weeks.

From the egg there escapes a little active, agile creature, somewhat resembling a *pediculus* in habits; in fact, the larva of one of the European species was described by so eminent an Entomologist as Kirby, in 1802, as *Pediculus melittæ*. This young larva, a magnified illustration of which is given in Fig. 49,* is of a bright yellow color, and of an elongated form, with fourteen segments. The three segments which constitute the trunk are strong and powerful, for the attachment of the legs, which are furnished with sharp pointed claws, especially adapted for clinging securely to any object. The anal segment on its under surface is developed into a pair of short prolegs. It moves with great celerity with its six true legs; it can also make use of its anal prolegs, and thus climb a nearly smooth and vertical surface.

Fig. 49.



The young larvæ of most insects, if food is not supplied to them within a day or so of the time of their escaping from the egg, will die of starvation, but these young creatures will live from two to three weeks without food and maintain their activity, a wonderful adaptation to the circumstances in which they are placed. When hatched they crawl to the

* The small outline alongside shows this larva of the natural size.

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surface and run up the stems of various plants, and often lodge themselves in the flowers and there await the visits of bees and other insects who alight to collect pollen or honey. They watch their opportunity, and attach themselves with great readiness to any of these insects who may come within their reach. It is astonishing with what celerity they fasten themselves to their victims the instant any part of its body is accessible, and with what tenacity they adhere to it, seizing it by the leg, wing, or hairs of the body, and crawling up and adhering around the insertion of its legs between the head and thorax or the thorax and abdomen, exciting the greatest possible uneasiness in the winged insect, who vainly endeavors to detach them from its body.

Some observers are of opinion that the parasite draws nourishment from the bee on which it fastens, but the main object of this instinctive attachment seems to be to get access to the cells in which the young and food are stored. Once here, the young larva of *Meloe* is said to attack the larva of the bee or other hymenopterous insect whose nest is thus invaded, and being furnished with strong mandibles, they thrust them into the soft parts of their victims, and prey on their substance through the wounded integuments, while the young bee is nourished with the stored pollen and honey. In this state, having no longer any use for their active limbs, they are gradually reduced to mere tubercles, and after a change of skin, the once active and sprightly creature assumes the form of a thick, fleshy maggot. In this form it continues to feed on the young bees or the bee bread and honey stored for their use, and after passing through some remarkable changes while in the larval condition, first changing to a semi-pupa, then to another form of larva, it subsequently assumes the true pupa state, in which condition it remains in its snug retreat until the following spring, when it bursts its bonds and appears as a beetle.

The young *Meloe* larvæ often attach themselves to the hairs of insects which construct no cells and do not store up food for their young; and in such cases, which must be very numerous, they necessarily perish. In the light of this fact we can appreciate the importance of the great fecundity of the females.

The larva of *Cantharis vesicatoria* is almost identical in form with that of *Meloe*, but soon after escaping from the egg it changes from a yellow to a darker hue, and finally to a deep black.

The history of our American species is as yet very fragmentary. Dr. Packard has observed the larva of *Meloe angusticollis*, and found it to differ

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but little from its European congeners. Prof. Riley has made some observations on *Epicauta vittata*. He describes the eggs of *vittata* as follows: Length 0.08 inch, five times as long as wide, elliptical and so uniform in diameter that it is difficult to say which is the anterior end, though there is a slight difference. Egg sometimes very slightly curved. Color very pale whitish yellow, smooth and shining.

The young larva is yellowish-brown, borders of head and thorax and of joints somewhat more dusky than general surface; tip of jaws and eyes dark brown. Legs and venter paler; venter not corneus except at sides and across segments eleven and twelve. About ten stiff hairs visible superiorly on the posterior border on the middle segments, with a cone-like prominence at the base of each and six minor bristles in front of them. There are also rows of fainter ventral bristles.

The curious history of these insects throws some light on the fact that while in some localities they are enormously abundant one season, they will be very scarce another. It is to be expected that there would be an alternation between the abundance of certain species of hymenopterous insects and Cantharides. When the insects they prey on are abundant the blistering beetles multiply amazingly, and during this immense multiplication exhaust the stock of material on which they feed to such an extent that a year of great abundance in any given locality can scarcely fail to be followed by a season of corresponding scarcity. In other, and sometimes adjacent localities, where the same causes have not operated to a like extent, the insects may be common enough. The great abundance of the sociable and solitary bees in the great plains of the West will probably always afford food sufficient to admit of the maturing of large broods of Cantharides.

AGENCY FOR THE EXCHANGE AND SALE OF COLEOPTERA.

Mr. E. P. Austin, of Cambridge, Mass., has established an agency for the exchange and sale of Coleoptera. Parties having Coleoptera which they desire to dispose of, either in exchange for other species or for cash, should write Mr. Austin.

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ON SPECIES OF CATOCALA.

BY A. R. GROTE,

Director of the Museum, Buffalo Society Natural Sciences.

Catocala simulatilis Grote.

The male is now taken by Mr. Jas. Angus. The species is larger than *obscura*, agreeing with it in tone and in the white fringes of hind wings; it may be distinguished by the strongly marked median lines of primaries with a deeper toothing. The lines in *obscura* are thread-like, inconspicuous, and with shallower indentations. The opinion expressed that *simulatilis* is the ♀ of *obscura* must be the result of error; as I remarked at the time of describing the species, such a sexual variation would be without a parallel in the genus. *Residua* is distinguished from *obscura* and *simulatilis* by its blackish fringes to the hind wings.

Catocala flebilis Grote.

There occurs a variety of *C. retecta* with shaded fore wings, which may be mistaken for *C. flebilis*, which has peculiar pearly ash fore wings with the outer margin more oblique. Whether Mr. Strecker has figured a variety of *retecta* for *flebilis* is uncertain from the coarseness of his figure. This suffusion of the primaries occurs in *amatrix* among the red-winged species (Group 3).

Catocala Angusi, n. s.

♂ ♀. Six specimens received from Mr. Angus belong to a new form with black hind wings and blackish fringes, except at apex. It belongs then with the series of *C. insolabilis* and *C. residua*, and is similarly sized. It may be distinguished from *residua* by its paler, evenly grayish primaries and by the t. p. line having a longer costal tooth, as in *simulatilis*. Lines distinct; subreniform open. From *insolabilis* it varies by the want of the bright blue gray tint of fore wings and the absence of the darker shade on internal margin. It varies by having in some specimens a basal black shade, and again another from reniform to below apex. Behind the t. p. line its last sinus is usually a blackish shade. Beneath the body is white and the wings as in allied forms, with the outer white bands very narrow. One specimen has the black suffusions very broad, the ground color of the wing very pale gray, and the subterminal gray band distinct, as it usually

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is in *residua*. The latter species may be known by the deeper tone of primaries from base to subterminal line. The fore wings in *Angusi* are not dusky as in *residua*, *simulatilis* and *obscura*, but slightly greenish gray, not very bright.

Catocala mira Grote.

This form is mentioned by Prof. Snow. It is as large as *polygama*, without determinate greenish or brown shades on fore wings. Lines black; t. a. more denticulate than in the three allied forms, *crataegi*, *polygama*, *pretiosa*. The pale shade over the sub-reniform from costa is without dark irrorations, distinct. The primaries are pale, more gray and smoother than in contrasted forms. The hind wings are of a *deeper* yellow, bands very similar, while the internal margin is notably *free* from dusky hair and scales. Beneath the black band is broader than in its allies. I do not think that any of these four forms now intergrade. They may be considered as distinct "species."

Catocala cerogama, var. *Bunkeri*.

This form of *cerogama*, received from Mr. Robert Bunker, has the band on secondaries extremely narrow and the yellow basal shade entirely lost. On the fore wings the median space is deeply brown tinted, setting off the white sub-reniform.

Catocala habilis, var. *basalis*.

Differs from the type in the presence of a basal black ray on primaries. On hind wings the median band is broader; the fringe is medially scalloped in black. The terminal inflection of the t. p. line on primaries is deeper and more distinctly black marked. The form seems to be a little larger than the type. Specimens received from Mr. Robert Bunker, taken about Rochester, N. Y.

In studying the black-winged series we may divide them by the fringes in sub-groups.

Fringes white.

1—epione.
2—sappho.—
3—*agrippina.*
4—lacrymosa.
5—viduata.
6—desperata.
7—retecta.
8—flebilis.
9—simulatilis.
10—obscura.
11—Robinsonii.

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Fringes blackish :

12—Levettei.
13—insolabilis.
14—Angusi.
15—residua.
16—tristis.

It is somewhat strange that there are as yet no black-winged species known from California. One is described from Siberia, *C. dissimilis* Bremer.

Catocala relicta.

In my first general paper on the North American species of *Catocala* (Proc. Ent. Soc. Phil., Jan., 1872), the brief notice of *C. relicta* includes the statement that "the narrow central fascia of the secondaries is pure white." Up to this time I find no notice of a distinct powdering of blue scales which edge this fascia (more noticeably sometimes about the middle of the wing) on my present examples. It is not easy to see these blue scales at first, but the attention once directed to them, they become apparent. This discovery leads me to compare more closely our species with the European *fraxini*, which it is held to "represent," and which has the central fascia of the hind wings entirely bluish. The European species seems to be larger than *relicta;* the transverse posterior line less perpendicular, more deeply notched and more outwardly exserted opposite the cell, with more prominent teeth. Above the primaries are evenly dusted with dark scales in *fraxini*, and consequently more unicolorous; the darkest specimens of *relicta* evidently owe their color to a spreading of transverse blackish shades, the ground color, however narrowed, being white. The edge of the hind wings is white in *relicta*, gray in *fraxini*. Beneath both the species are pure white. The similarity of the under surfaces in these two species led me to reflect on the fact that in the Noctuidæ variation seems to be shown first on the upper surface of the primaries; it will be recollected that these are the more often exposed. There is, then, more white on *relicta*, on both wings; the central and principal portion of the fascia on the hind wings being pure white. With a large material in all stages it would be interesting to more fully compare the two species, which have probably a common origin. It is interesting, meanwhile, that the blue color is retained in both forms, although in one it may not always be expressed. If the two species had a common parentage, the blue color has been affected most probably by the different surroundings of the now separated forms.

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The fact that the under surface in *fraxini* is bright and white as in *relicta*, while the upper surface of the wings is more obscure than in the American species, is worthy of note. I think that if we may localize the features of variation in markings as occurring first on the upper surface of the wings, especially on the primaries, we may draw some conclusions as to the relationship between different species of Noctuidæ from the degree of similarity beneath. I have elsewhere shown that the variability of *C. relicta* in the tone of the fore wings is not a sexual character.

NOTES ON SOME OF THE GENERA OF MR. SCUDDER'S "SYSTEMATIC REVISION."

BY THEODORE L. MEAD, CORNELL UNIVERSITY, ITHACA, N. Y.

After reading Mr. Peabody's paper in the August number of the CANADIAN ENTOMOLOGIST, I determined to verify some of the measurements given as characterizing Mr. Scudder's genera, as it seemed hardly possible that many of the numerical relations there given should prove absolutely constant; and after examining a large number of species and specimens, these relations proved variable beyond all expectation. The measurements of the venation were taken directly from the wings by the aid of a thin sheet of transparent gelatine ruled with lines $\frac{1}{10}$ of an inch apart, the wings having been bleached by Mr. Dimmock's admirable process.

Recently I have carefully gone over the measurements of the same specimens, of the groups Lycaeides, Glaucopsyche and Cyaniris, with a microscope, measuring by means of an eye-piece micrometer and mechanical stage to the nearest thousandth of an inch, and find that the former measurements coincide sufficiently with these to warrant confidence in accepting the remainder as substantially correct.

The results prove that the venation of the wing is very variable even in specimens of the same species, and that no generic distinctions whatever can be based on slight differences in the proportionate length of the cell and wing, or the origin of the first and second branches of the subcostal nervures of primaries.

I have reduced the proportions of these parts mentioned by Mr. Scudder to percentages, so that comparison will be easy. The species

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of Lycænidæ examined were as follows: Of *Lycæides, anna, melissa, acmon, Scudderii;* of *Glaucopsyche, lygdamas, oro, Couperii;* of *Cyaniris, pseudargiolus* (6), *violacea* (5), *neglecta* (2), *lucia;* of *Everes, comyntas* (4).

In the first place, the 1st superior branch of subcostal is given as arising in *Everes* at 50 per cent. +, of the distance from base to apex of cell. I find it to vary from 50. to 54.5. In *Lycaeides* it should arise at 67.; I find 52.2 to 59.8. In *Cyaniris* the Revision gives "scarcely ⅔" (67.—); I find 55.7 to 64. In *Glaucopsyche* it should arise "somewhat beyond the middle" (50.+); I find 57.8 to 63.1. The reader will notice how these numbers overlap each other, thus totally failing to give any distinction between the groups.

The second branch of the same nervure should arise in *Lycæides* at 50 per cent. of the distance between the 1st superior and 1st inferior branches; I find 44.8 to 47.4. In *Glaucopsyche,* also 50 per cent., my results being 37.7 to 46.9. In *Cyaniris* this nervure should arise at "less than half way from base to apex of cell" (50 per cent.—); I find 43.4 to 51.9, and in *Everes* instead of 25., I find 30. to 33. In this last case the numbers do not overlap, probably because only one species (4 specimens) of *Everes* was examined, since the variation among individuals in the other groups is very considerable, and this is the only instance of the kind that I have found in comparing the venation of these genera.

Again, in length of cell as compared to length of wing, *Everes* varies from 43. to 49. per cent. (Revision gives 50.—); *Cyaniris* from 47.3 to 52.2 (Revision gives 50.); *Lycæides* from 47.3 to 48.9 (Revision gives 50+), and *Glaucopsyche* from 49.3 to 51.1 (Revision gives 50+).

I have adduced these Lycaenas since the published article tabulates their differences, but Mr. Peabody has kindly forwarded me advance sheets of a similar arrangement of the characters of other groups, and there the variation is perhaps even more striking than with the Blues.

In the table giving the distinctions whereon are based the genera *Speyeria, Argynnis* and *Brenthis* of Mr. Scudder, taking up every character *seriatim,* we find, first, that the antennæ of *Speyeria* and *Brenthis* are "a little longer than the abdomen," and of *Argynnis* "considerably longer than the abdomen." Taking the length of the abdomen as the unit, I found that the antenna measures in *Speyeria* 1.12 and 1.13, in *Brenthis* from 1.15 to 1.44, and in *Argynnis* from 0.93 to 1.37, which is certainly not in accordance with the characters as given.

The next characters relate to the number of joints of the antennæ,

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viz., 52 for *Speyeria*, 41 to 49 for *Argynnis*, and 33 to 34 for *Brenthis*. This matter I have not investigated.

The palpi and eye are compared, the length of the eye being taken as unity; in *Speyeria* they are stated to be 1.50, in *Argynnis* 2— to 2, and in *Brenthis* 2—. I find *Speyeria* 1.29, *Argynnis* 1.07 to 1.60, and *Brenthis* 1.33 to 2.

The fore tibiæ are compared with the hind tibiæ, being as .33 + in *Speyeria*, .40 ♂ or .40 + ♀ in *Argynnis*, and .50— ♂ or 50 ♀ in *Brenthis*. I find *Speyeria* .36, *Argynnis* .40 to .45, and *Brenthis* .29 to .44.

The tarsi are said to be scarcely shorter than the tibiæ in *Speyeria*, in *Argynnis* .75 +; I find for *Speyeria* .80, and for *Argynnis* .80 to .88.

The middle tibiæ are said to be "a little shorter than the hind pair" in *Speyeria* and *Argynnis*, "scarcely shorter" in *Brenthis*. I find for *Speyeria* .89, for *Argynnis* .85 to .96, and for *Brenthis* .81 to .93.

The 1st superior branch of the subcostal nervure is said to arise in *Speyeria* "beyond the middle of the outer half of the upper margin of cell" (*i. e.*, at 25 per cent.—, inside apex); in *Argynnis* "in the middle of the outer two-fifths of the upper border of cell" (*i. e.*, at 20 per cent. inside apex); and in *Brenthis* "shortly before the apex of the cell." For *Speyeria* I find 22.1 and 24.; for *Argynnis* a range of from 13.5 to 23.6, and for *Brenthis* from 2.6 to 17.5. In a single species of *Argynnis*, viz., *atlantis*, I find in 10 specimens taken at random the surprising variation of from 14. to 23.6.

The next character is the only one among all those given for these three genera that I have been able to verify from specimens, and even here the variability is startling.

Mr Scudder gives the second branch of the subcostal as arising in *Argynnis* at "half way between the 1st and the apex of the cell" (*i. e.*, at 50 per cent.) and in *Brenthis* as at a similar distance beyond it (*i. e.*, at 100 per cent. beyond). For *Speyeria* no corresponding character is given. I find in all specimens which I have examined that this 2nd branch is given off in *Argynnis* within the apex, and in *Brenthis* beyond it, but the precise point varies in *Argynnis* from 55.6 to 15.0 per cent. within apex, and in *Brenthis* from 114. to 1500. per cent. beyond it, Mr. Scudder's unit (the distance between the origin of 1st branch and apex of cell) being adopted.

The last characters relate to the length of cell, which the Revision

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gives for *Speyeria* as 40 per cent. of length of wing, for *Argynnis* as "considerably less than" 50, and for *Brenthis* as "nearly" 50. The measurements give for *Speyeria* 40.5 to 46.1, for *Argynnis* 39.3 to 47.6, and for *Brenthis* 39.7 to 48.7, the average of the 26 specimens of *Argynnis* being 44.5, and of the 13 of *Brenthis* 44.1.

Hence we find that out of all the characters given in the Revision as separating these three genera, there are none that divide *Speyeria* from *Argynnis*, and but a single peculiarity separating *Argynnis* and *Brenthis*, and that sometimes varying fifteen hundred per cent. from the numerical ratio assigned to it, leaving out of account, for the present, the number of joints in the antennæ, which I have not been able to investigate as yet. In venation and length of cell, *Euptoieta claudia* agrees with *Brenthis*, being about midway between *bellona* and *myrina*, so that though we might be inclined to accept this character as sufficiently separating *Argynnis* and *Brenthis*, the latter group would need further limitation to exclude *Euptoieta*. The Melitaeas and Phyciodes also have the second branch outside the cell.

A table is appended giving these measurements reduced to percentages, for *Speyeria*, *Argynnis* and *Brenthis*, showing how extremely variable the species and individuals are, and that such proportions are not in any wise to be depended on even for specific characters. A large number of measurements have been made in the genera *Phyciodes* and *Melitæa*, but these results must be reserved for a later paper, since their reduction and comparison will require considerable time, and since a number of additional measurements remain to be made in order to complete the series.

TABLE.

Length Antenna.

(Abdomen = 1.)

A. atlantis..... .93	B. bellona..... 1.15
A. aphrodite..... 1.06	A. atlantis..... 1.21
A. Bremnerii..... 1.08	A. cybele..... 1.21
A. aphrodite..... 1.11	B. myrina..... 1.21
S. idalia..... 1.12	A. aglaia..... 1.24
" 1.13	A. aphrodite 1.26
A. cybele..... 1.13	" 1.33
	B. euphrosyne..... 1.37
	B. freya..... 1.42
	B. epithore..... 1.44

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The Revision gives

Speyeria....."a little longer."
Argynnis..... "
Brenthis.. "considerably longer."

Length Palpi.

(Eye = 1.)

A. cybele.....1.07
A. Bremnerii.....1.17
S. idalia.....1.29
B. myrina.....1.33
A. atlantis.....1.40
B. bellona.....1.43
A. aphrodite.....1.50
B. euphrosyne.....1.56
A. aphrodite.....1.58
A. aglaia.....1.60
B. epithore.....1.75
B. freya.....2.00

The Revision gives

Speyeria.....1.50
Argynnis.....2—. to 2.
Brenthis.....2—.

Length Fore Tibia.

(Hind Tibia = 1.)

B. bellona.....29
B. myrina.....29
S. idalia.....36
B. epithore.....37
B. freya.....37
A. Bremnerii.....40
A. aphrodite.....41
A. cybele.....42
B. euphrosyne.....44
A. atlantis.....45

The Revision gives

Speyeria.....33+
Argynnis.....40 or .40+
Brenthis.....50— or .50

Length of Tarsi.

(Fore Tibia = 1.)

A. cybele.....80
S. idalia.....80
A. Bremnerii.....88
A. aphrodite.....89

The Revision gives

Speyeria.....
Argynnis.....75—

Length of Middle Tibia.

(Hind Tibia = 1.)

B. freya.....81
A. atlantis.....85
A. aphrodite.....86
B. epithore.....87
B. euphrosyne.....89
B. bellona.....93
B. myrina.....93
A. Bremnerii.....95
A. cybele.....96

The Revision gives

Speyeria....."a little shorter."

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Argynnis....." a little shorter."
Brenthis....." scarcely shorter."

1st Branch s. c. from apex cell.

(Length cell = 100.)

B. bellona.... ..... 2.6
B. chariclea.... ..... 8.8
B. myrina.....12.9
B. freya.....13.3
B. arsilache.....13.3
A. aglaia 13.5
A. aphrodite, var.....13.6
A. atlantis.....14.0
B. thore.....14.3
B. amathusia.....14.5
B. triclaris.....15.1
A. Bremnerii.....15.4
B. epithore.....15.8
A. atlantis.....16.1
B. helena.....16.2
A. atlantis.....16.7
B. selene.....16.7
A. atlantis.....17.2
A. cybele.....17.2
B. dia.....17.2
A. Meadii.....17.4
B. euphrosyne.....17.5
A. cybele.....17.6
A. atlantis.....18.1
A. cybele.....18.2
" 18.5
A. atlantis.....18.7
A. aphrodite.....18.9
A. aglaia.....19.5
A. diana.....19.5
A. cybele.....20.0
A. atlantis.....20.0
A. Edwardsii.....20.1
A. cybele.....20.2
A. aglaia 20.4
A. Edwardsii.....21.2
A. atlantis.....21.3
S. idalia.....22.1
A. atlantis.....22.2
A. cybele.....23.1
A. atlantis.....23.6
S. idalia.....24.0

The Revision gives

Speyeria.....25.—
Argynnis.....20.
Brenthis.." shortly before apex."

2nd Branch s. c. from apex cell.

(Distance 1st Branch to apex = 100.)

	Inside
A. atlantis..	55.6
A. aphrodite, var..	50.0
A. atlantis ...	48.0
A. Meadii .	47.4
A. cybele	44.4
A. atlantis..	44.4
A. aglaia	42.9
A. Edwardsii	42.9
A. atlantis	41.7
A. cybele..	39.1
"	38.7
A. Edwardsii	38.5
A. aglaia ..	36.4
A. cybele	35.8
A. atlantis..	35.8
A. cybele	34.8

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A. diana	33.3
A. cybele	33.3
A. atlantis	33.3
"	28.6
A. aphrodite	28.0
A. Bremnerii	25.0
S. idalia	23.5
"	22.2
A. atlantis	20.0
A. aglaia	20.0
A. atlantis	19.0
"	15.0
	Beyond
B. euphrosyne	114.
B. dia	146.
B. thore	150.
B. arsilache	162.
B. selene	182.
B. helena	191.
B. epithore	200.
B. triclaris	240.
B. freya	244.
B. myrina	250.
B. amathusia	282.
B. chariclea	433.
B. bellona	1500.

The Revision gives

Argynnis	50. inside
Brenthis	100. beyond

Length of Cell.

(Length wing = 100.)

A. Edwardsii	39.3
B. myrina	39.7
S. idalia	40.5
A. aglaia	41.3
B. amathusia	42.2
B. freya	42.5
A. diana	42.6
B. arsilache	42.9
A. cybele	43.2
B. selene	43.4
A. cybele	43.4
A. atlantis	43.5
B. chariclea	43.6
B. helena	43.6
B. epithore	43.7
A. cybele	43.8
" (2)	43.9
"	44.1
A. Edwardsii	44.2
A. atlantis	44.3
B. dia	44.4
S. idalia	44.4
A. atlantis	44.4
B. triclaris	44.6
A. aphrodite, var	44.7
A. Meadii	44.7
A. atlantis	44.9
"	45.0
"	45.3
"	45.5
A. Bremnerii	46.0
S. idalia	46.1
A. atlantis (2)	46.2
A. aglaia	46.6
B. thore	46.7
A. aglaia	46.7
A. atlantis	47.6
B. euphrosyne	47.6
A. aphrodite	47.6
B. bellona	48.7

The Revision gives

Speyeria	40.0
Argynnis	"considerably less than" 50.
Brenthis	"nearly" 50.

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MISCELLANEOUS.

Mr. W. H. Edwards, of Coalburgh, W. Va., wishes to know how far north the black variety of *turnus*, female, is found, and also how it compares in abundance with the yellow variety at the west and south. We trust that some of our readers will be able to supply the needed information.

J. C. Wasserman, 50 Beverley Terrace, Cullercoats, England, wishes to exchange British Lepidoptera for Canadian; parties desirous of exchanging will please write him.

Wm. Barnes, Decatur, Illinois, wishes to exchange insects from Decatur for Canadian insects, and with this view will be glad to correspond with Canadian collectors.

Mr. H. K. Morrison, of Cambridge, Mass., has been engaged during the past summer in collecting the insects of Southern and Middle Georgia and of the Black Mountains of North Carolina (6,700 feet high), the latter a region hitherto unexplored. He has succeeded in obtaining a large series of insects of all orders, especially Lepidoptera and Coleoptera.

CORRESPONDENCE.

OBSERVATIONS ON SPHINGIDÆ.

My summer's experience with the larvæ of rare Sphingidæ is, that *Smerinthus astylus* Westwood, *Smerinthus myops* Harr., *Darapsa versicolor* Clemens, and *Darapsa choerilus* Walk. are all double brooded. A characteristic of *astylus* is its caudal horn, which is armed with two spines at its tip, appearing bifurcate at first glance. These spines are constant from its hatching. Color of horn, dark brown at tip and base; pale green in centre*, pointing forward. The long life in its larval condition, and consequent exposure, may in a measure account for its exceeding great rarity. Have fed some from six to seven weeks.

Smerinthus myops.—I have found that the red blotches on larvæ are not uniform, and are more prevalent on the late brood, although some are entirely green and correspond in color to similar spots found on the leaves of the wild cherry at that season.

Darapsa versicolor.—Caudal horn points backward, is straight until the last moult, when it assumes a fine curve to the rear. Color of curved

* At last moult the dark brown is faded to an extremely light shade.

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horn, black above, orange beneath. The larva presents two colors, pale green and brown, which are not sexual distinctions. Eggs of all pale green, slightly flattened. GEO. W. PECK, New York.

NOTES ON VANESSA LINTNERII, FITCH.

In 1856, Dr. Fitch described a butterfly allied to *Antiopa*, and named it in honor of its discoverer, J. H. Lintner.

A butterfly was captured here last summer that is nearly as far removed from *antiopa* as *Lintnerii*. I copy Dr. Fitch's description, and point out the differences. He says: "This butterfly is closely related to *antiopa*, or white-bordered butterfly. Its wings have perfectly the same form and are similarly colored to those of *antiopa*, but their pale border is twice as broad as in that species, occupying a third of the length of the wings, and it is wholly destitute of the row of blue spots which occur in *antiopa* forward of the border."

The specimen before me differs from the one described by the Doctor in two respects: the wings are shorter proportionally than in *antiopa*, and shaped more like those of *Vanessa J-album*. In the second place, the lobes or tails of the hind pair of wings are larger and not as pointed as those of *antiopa*. Again, the Doctor says its ground color is deep rusty brown, much more tinged with liver reddish than *antiopa;* the fore margin of the anterior wings is black, freckled with small transverse white streaks and lines, but is destitute of the two white spots which are seen in *antiopa*. My specimen has the white spots mentioned by the Doctor, but they are small and not well defined. The specimen before me coincides with the remainder of Dr. Fitch's description, which is as follows:

"The broad outer border is of a tarnished pale ochre yellow hue, speckled with black the same as in *antiopa*, and becomes quite narrow at the inner angle of the hind pair of wings. The wings beneath are similar to those of *antiopa*, but are darker and without any sprinkling of ash gray scales or any whitish crescent in the middle of the hind pair, and the border is speckled with gray whitish in wavy transverse streaks, without forming the distinct band which is seen in *antiopa*."

ROBERT BUNKER, Rochester, N. Y.

ERRATA.—On page 160 of present volume, 15 lines from bottom, "P. O. Zeller" should be P. C., and 3 lines from bottom, "since he," &c., should read "since—." This sentence has no reference to Mr. Scudder, which by an error of the printer it is made to have.

On page 213, 17 lines from bottom, for *Hypsaphalus* read *Hypocephalus*.

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